ward at Haäsi village it is about 800 feet wide. During the north monsoon strong westerly winds frequently persist for several days. Currents along this stretch of coast are strongly felt off the southwest shore of the strait and off the village of Haäsi. The water temperature is always greater than 70° F.

The beach is composed of a mixture of coral and volcanic sand. It is narrow, steep, and firm. A small stream cuts across the beach in the vicinity of Haäsi. The land behind the beach is a narrow, low, swampy plain which rises inland along the steep tree-covered slopes of the mountains Siwoge and Kalokko. Immediately behind the beach there is an automobile road which runs from Lesa village on the west coast of the island to Haäsi on the south coast. At these 2 points, the road narrows to a path which completes the circuit of the island close to the shore. In addition to the coastal road and path a trail follows inland from Tahoelandang village through the valley between 2 mountains and then around the slopes of the volcano to Minanga village on the north coast.

(*b*) *East and northeast coast beaches.* (PLAN 20, Section J(b)) Reliability POOR. A number of possible landing beaches lie in small bays separated by cliffs on the east and northeast coasts of Tahoelandang Island between the villages of Likei, 2° 20′ N, 125° 27′ E, and Boelangan, 2° 23′ N, 125° 26′ E. The approach to the steep-to coast is clear. A heavy surf usually prevails along this coast during the north monsoon. The beaches are composed of a mixture of coral and volcanic sand with the latter predominating. The beaches in general are narrow, moderately steep, and firm. A stream crosses one of the beaches immediately south of the village of Boeha. Immediately behind the beach there is a narrow plain, covered with coconut palms, which rises a short distance inland along the moderately steep slopes of a range of mountains. All of the beaches in the area are backed by a coastal path.

(*c*) *North coast beaches.* (PLAN 20, Section J(c)) Reliability POOR. Two possible landing beaches, separated by a cliff or bank, lie at the head of Minanga Bay on the north shore of Tahoelandang Island at 2° 22′ N, 125° 24′ E. The bay is easily recognized since it lies in the break on the north-northwest side of the Mount Malingge. The approach to the head of the bay over a steep sand bottom is clear. Deep water lies extremely close to shore or the very narrow fringing coral reef which exists locally. During the north monsoon the surf is high along the shore, but during the transition period and the south monsoon the area is well sheltered. The water temperature is always greater than 70° F. The beaches are narrow, moderately steep, firm, and composed of volcanic sand and debris. Streams cross both beaches. The best landing place is near the stream mouth on the eastern beach. Inland from both beaches there is a narrow stream valley whose sides rise along steep slopes to the mountain peaks. Exit from the beaches is by the coastal path or by a trail which crosses the island to Tahoelandang village on the west shore of the island.

K. Sangihe Islands: Roeang Island.

(PLAN 20)

(1) Offshore zone.

The ocean bottom drops off rapidly near Roeang Island. For example, there is a depth of 20 fathoms a little more than 100 yards from the south side of the island, and on the east side the same depth is 300 yards off. See also Offshore Zone for Tahoelandang Island, above.

(2) Coastal topography.

Roeang Island (FIGURE IV - 58), close southwest of Tahoelandang, consists almost entirely of an active volcano, 2,398 feet in height. The slopes consist chiefly of loose material locally cut by deep gullies. The summit is on the east side of the crater and is easily recognized by several sharp rocky points. At a distance the volcano has the appearance of a table mountain with steep sides.

On the southeast and east sides of the volcano great slides extending down to the sea, have taken place in recent times, resulting in the disappearance of vegetation. The coastline in places has thus been extended. Recent slides along the northern slopes did not reach sea level and, consequently, lowland vegetation has remained there. The coast of Roeang Island descends steeply to the sea on the north and south.

(3) Anchorages.

See Tahoelandang, Topic 42, J, (3).

(4) Dangers to navigation.

A coral reef extends from the western end of Roeang Island; otherwise, there is no coastal reef.

(5) Landing beaches.

(PLAN 20 Section K(a)) Reliability POOR.

Three beaches separated by cliffs or banks lie on the northwestern and northwestern shores of Roeang Island. Westerly winds during the north monsoon persist for several days at a time antl create a high surf along the western shore of the island. Although the northeast coast is protected from these winds and seas, a strong current sets southeastward along the coast on the flood and northwestward on the ebb. The water temperature is always greater than 70° F. The firm beaches are composed of a fine, black, volcanic sand with scattered lumps of coral. The area immediately behind the beaches rises in moderately steep slopes to the crater of the volcano. Information regarding trails on the island is lacking.

L. Sangihe Islands: Biaro Island.

(PLAN 20)

Biaro Island lies 13 miles south of Tahoelandang. It is the southernmost of the Sangihe Islands.

(1) Offshore zone.

The passage between Biaro on the north and Bangka and Talise on the south is 18 miles wide and apparently deep and clear.

(2) Coastal topography.

Biaro Island is hilly and has a very conspicuous peak, Mount Boekide, which is 1,316 feet in height. The island is densely wooded and hilly, rising to secondary heights of 1,142 and 1,178 feet. Tandoekoehang Island is a small islet, 177 feet in height, lying off the southwestern point of Biaro.

(3) Anchorages.

In the bight on the northwest side of Biaro there is anchorage in 38 fathoms off the village of Lamanggo, with the highest peak of the island bearing 139° (FIGURE IV - 60). There are cross currents in this vicinity.

(4) Dangers to navigation.

Off the northwestern point and off the northeastern point of Biaro there are shoal spots. At the low northwestern point of Tandoekoehang there is a 30-foot pillar-like rock. The outermost shoal, with a depth of 3¼ fathoms, lies 1,600 yards northwestward of the point. The currents are strong among the shoals in this vicinity. Another pillar-like rock stands near the northeastern point. From this point a submerged ridge extends 1½ miles off with a depth of 22 fathoms on its outer end. The currents are strong over this ridge. Along the east coast are several dangers close to the shore.

(5) Landing beaches.

(a) Lamonggo beach. (PLAN 20, Section L(a)) Reliability POOR. A possible landing beach lies in the bight on the northwest side of Biaro Island, at 2° 08′ N, 125° 21′ E. The beach is easily recognized by a pillar-like rock 30 feet high, which stands on the low point northeast of the beach. The approach to the shore is obstructed by a shoal, least depth 19 feet, which lies nearly 1 mile northwest of the pillar-like rock. Shoreward of the shoal the approach to the beach is clear over a steep bottom. During the north monsoon heavy seas break violently on the beach. Caution should be exercised when landing at this point, since strong cross currents exist. The narrow beach, composed of coral and volcanic sand, is firm and steep. The best place to land is near the stream mouth in front of the village Lamanggo, since the point immediately eastward provides some protection against northeast winds. Immediately behind the beach there is a narrow plain which rises along moderate slopes, a short distance inland, to the hills which cover the island. Information regarding roads or trails on the island is lacking.

(b) Karoengo beach. (PLAN 20, Section L(b)) Reliability POOR. A small possible landing beach lies on the east side of the bay, on the north side of Biaro Island in front of the village Karoengo, at 2° 07′ N, 125° 24′ E. The bay is recognized by a pillar-like rock which stands on the northeastern point of the island and an extensive drying coral reef which extends seaward from the same point. The approach to the bay is obstructed by a 16½ foot patch which lies about 1,140 feet from the shore reef. On approaching the shore, caution should be exercised since the sandy bottom shoals rapidly, and the reefs are difficult to distinguish when the sea is calm. The fringing reef along the shore of the bay is extensive but near the village there is a break in it through which small boats may pass. Heavy seas impinge on the reef during the north monsoon. Outside the bay a strong current runs over the ridge which projects from the northeastern point of the island.

The beach is composed of coral sand and debris, and is narrow, steep, and firm. The land behind the beach consists of a low plain which is narrow near the northeastern point of the island but widens southward. Inland the plain rises along steep slopes to the crest of a ridge of mountains which extends southward from the northeast point of the island. Information regarding roads or trails is lacking.

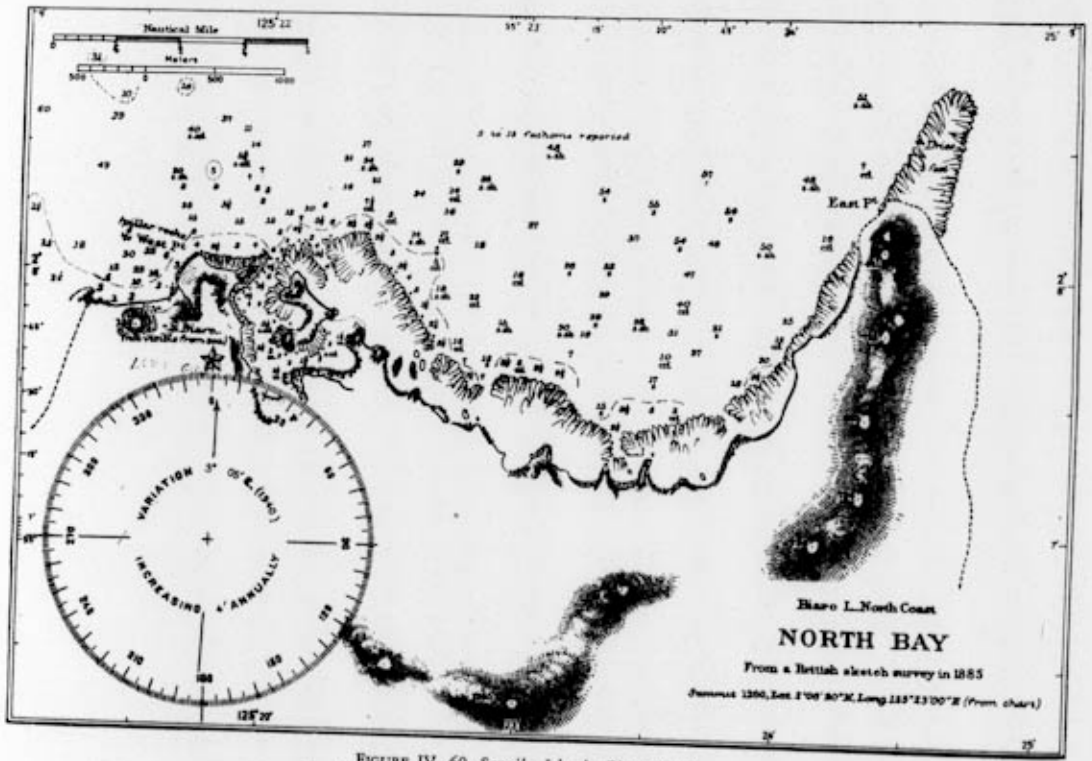

FIGURE IV - 60. *Sangihe Islands. Biaro Island.*
Section from HO chart 3061, showing N coast of Biaro Island.

(*c*) *Boeang beach* (PLAN 20, Section L(c)) Reliability POOR. A small possible landing beach lies on the southwest coast of Biaro Island in front of the village Boeang at 2° 05′ N, 125° 20′ E. The approach to this beach is clear through deep water over a stony bottom. The beach is narrow, firm, steep, and composed of coral sand and debris. Immediately in front of the village the beach can be reached through a break in the coral reef. A short distance behind the beach a narrow plain rises along moderate to steep slopes to the hilly interior of the island.

M. Talaud Islands: Karakelong Island.
(PLAN 21)

(1) Offshore zone.

The volcanic island of Karakelong rises from very deep water, the 100-fathom curve lying everywhere at an average distance of about 1½ miles from the coasts. At a distance of 10 miles from shore, depths of approximately 700 fathoms are found, except northwest of Point Ambora, where the depths are more than twice as great.

Beo Bay is clear beyond the 5-fathom curve. Within this curve the depths shoal rapidly from 10 to 3 feet. The most gradual slope is along the northern shore of the bay.

(2) Coastal topography.

The 3 largest of the Talaud Islands—Karakelong, Salebaboe, and Kaboerang—are hilly and heavily wooded (FIGURE IV - 61). All of them are low at the coast, and in places flat and even swampy.

Karakelong, the largest and northernmost island of the group, is 33 miles long. It is mountainous and wooded, the mountains being volcanic. The highest point of the group, 2,231 feet, is a mountain near the middle of Karakelong Island. The coasts of Karakelong are in general steep-to, except on the southern side where a bank of soundings joins it to Salebaboe. The southern coast is fringed by a reef nearly a mile wide. The west coast is high and steep, except near the bights, where the hills draw away from the coast; the broadest reefs are found in the bights. There is a landing place on this coast at Beo. (FIGURE IV - 62). Two small islets, Jolly (Dolong) and Mawawo (Topor) lie near the middle of the west coast. Reefs extend from both of these islets. On Jolly Island there is a conspicuous white monument. The north and east coasts of Karakelong are rocky and steep. The east coast is fronted by a drying coast reef with large rocks in places. On this coast is a landing place at Poeloetan.

About 15 miles south of Arangkaa anchorage on the east coast is Rainis Bay with reefs fringing both entrance points and 2 narrow reefs projecting from its head. The village of Rainis lies near its southwestern corner; Bantane village near its northwestern corner.

Beo Bay lies near the middle of the western side of the island. Its shores are fronted by a drying shore bank which consists of coral in the southern part. A conspicuous tree stands on the eastern shore of Beo Bay, north-northeast of the village of Beo, which is located on the southern shore of the bay. A stone pier, 426 feet in length, extends from the shore and has a depth of 5 feet at its head.

At Essang Bay both entrance points are fringed by reefs; that at the south point extends northward for more than 300 yards, but the reef at the north point is narrow.

(3) Anchorages.

On the northern side of the island, anchorage is possible in the small inlet at Mamahan village and in Bamboeng Bay. Anchorage is available on the northeast side of the island, in the bay at the abandoned village of Arangkaa. This bay lies between points Gemeh and Andaroewa. It has broad reefs extending from both sides of the entrance. Vessels can anchor in 16 fathoms of water, over mud and sand, with a small island open off the rocky northern point and Manginpoelo, a 430-foot hill, bearing 225°. The villages of Tatoeran and Boene lie on the southern shore of the bay.

Other anchorages on the east coast are found at Gemeh (1½ miles northwest of Arangkaa anchorage), off the villages of Apan and Banada (in the bight south of Point Andaroewa), off Amat Village (4½ miles south of Tanjung Andaroewa), and off Toabatoe Village (6 miles farther to the southward).

Essang Bay, on the west coast 14 miles northward of Beo, is 1 mile wide at the entrance. It has low shores and affords no shelter during the north monsoon. During continuous southerly winds, when the sea outside is rough, fairly good shelter may be found in the southern part. A shore bank with depths of less than 3 fathoms extends nearly ¼ mile from the shores of the bay. Good anchorage will be found in 25 fathoms with the steep south bank of the river bearing 86° and Point Papetoe, the rocky northern point of the bay, bearing 2°. The bottom, close to the village, is very steep. A strong current sets out of the river during heavy rains. Boats can enter the Essang River which discharges close north of the village.

Batoembalango Anchorage, with depths of 16 to 19 fathoms,

FIGURE IV - 61. *Talaud Islands. W coast of Karakelong Island. Beo Bay.*
Looking SE toward S side of bay. 1939.

is in the northern part of a bay about 11 miles northwest of Beo and 6 miles southward of Essang Bay. The bottom is very steep, and there is no shelter from westerly winds.

Anchorage is found at Tarohan, south of Beo, between an islet and the shore, in a depth of 19 fathoms, sand and coral bottom, about 425 yards offshore, the village bearing between 101° and 135°. Anchorage can also be found in Ambia and Maririka Bays, between Batoembalango and Essang.

Off Kiama village, on the south coast of the island, vessels will find sheltered anchorage during the entire year.

(4) Dangers to navigation.

A 10-foot shoal lies nearly ½ mile offshore, eastward of the anchorage off Kiama village; for other dangers in its approach, see Liroeng Strait.

A 1-fathom shoal lies southwest of Mawawa. Discolored water extends a considerable distance from the southern point of the island in a southerly direction.

Off Essang Bay shoal water extends from 400 to 700 yards offshore. The depths in the northern part of the bay are irregular.

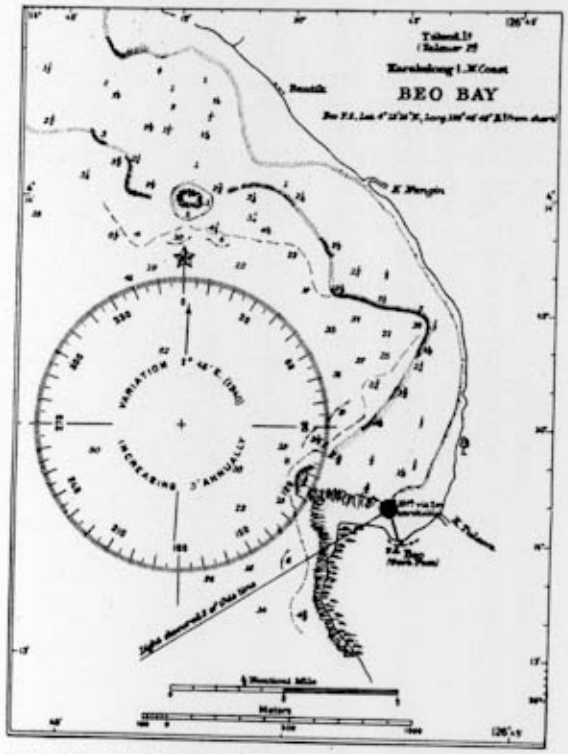

FIGURE IV - 62. *Talaud Islands. W coast of Karakelong Island. Beo Bay.* Section from HO chart 3061.

(5) Landing beaches.

(*a*) *East coast beaches,* south to Poeloetan, 4° 08′ N, (PLAN 21, Section M(a)) Reliability POOR. A small landing beach at Poeloetan and a number of possible landing beaches lie in bights and in breaks in the cliffs along the steep, rocky, north and east shores of Karakelong Island from Bamboeng Bay on the north coast, 4° 32′ N, 126° 47′ E, to the village Poeloetan on the east coast, 4° 09′ N, 126° 48′ E. The approach to the north and east coasts of the island is clear. The bottom is steep and is composed mainly of coral sand with mud, coral debris, and stone occurring locally. Near shore the reef is extensive in many places and may be encountered at any point, but more especially in Bamboeng Bay and along the stretch of coast between Point Batoembaliah and Point Manggaraas. Strong winds during the north monsoon create heavy seas and a high surf along the coast, except in the more sheltered bays.

The beaches in this area, fronted by coral reefs of varying width, are composed mainly of coral sand and debris, but mud may be expected locally near the numerous stream mouths. The beaches are in general narrow, steep, and firm. The best landing places in this area are near the stream mouths where the reef is generally the narrowest, but the beaches here may be soft. In general the land behind the beaches consists of a coastal plain of varying width which rises inland, on the northern portion of the island, along steep, well-wooded slopes to the crest of a range of low mountains which occupies the central portion of the island. Near the southern end of the area the mountains become lower and the slopes moderate. All of the landing places in the area are connected by a horse path and foot trail which completely encircle the island close to the shore. In addition to the coastal path, a connecting path trends westward from the village of Rainis on the east coast to Beo village on the west coast. In like manner, a trail connects Poeloetan Village with Tarohan Village.

(*b*) *South coast beaches.* (PLAN 21, Section M(b)) Reliability POOR. A possible landing beach lies on the southwestern shore of Karakelong Island between Point Mananantoleh, 4° 02′ N, 126° 48′ E, and Point Dampelan, 4° 04′ N, 126° 41′ E. The best landmark for the area is Salebaboe Island, a short distance southwest of Karakelong, which is recognized by a saddle-like formation of hills at the middle of the island. The approach to the beach is clear in general but numerous charted shoals lie in Liroeng Strait. The entire beach area is lined with a narrow, fringing, coral reef. During the south monsoon heavy seas occasionally are felt on the beach, but in general the area is well protected during the entire year. Currents varying in velocity from 2 to 3 knots exist in Liroeng Strait. The water temperature is always greater than 70° F. The beach is narrow, steep, firm, and composed mainly of coral sand and debris. Numerous streams cut across the beach. The best place to land is in front of the villages and at the stream mouths where the reef is usually the narrowest. The land behind the beach consists of a coastal plain of varying width which rises inland along moderate slopes to the hills of the interior. The main coastal trail lies immediately behind the beach.

(*c*) *West coast beaches, southern segment.* (PLAN 21, Section M(c)) Reliability POOR. A possible, extensive landing beach, interrupted locally by short stretches of cliff, lies on the southern section of the western shore of Karakelong Island between Point Dampelan, 4° 04′ N, 126° 41′ E, and Point Maroemoeng, 4° 14′ N, 126° 47′ E, the southern entrance point to Beo Bay. The approach to this stretch of coast is over a steep sand and stone bottom and is clear to the fringing coral reef which lines the more prominent stretches of coast. During the north monsoon strong westerly winds which occasionally persist for from 1 to 4 days create a heavy surf along the shore. The water temperature is always greater than 70° F.

The beach in this area is composed of coral sand with coral

debris of various sizes existing locally. Numerous small streams cross the beaches. The best places to land in the area are in the small indentations in the coast and at the stream mouths where the reef is usually narrowest. The land behind the beach consists of a coastal plain of varying width which rises inland along moderate-to-steep slopes to the hills which lie along the center of the island. The coastal path lies immediately behind the beach. Near the center of the area a trail trends eastward from the village of Tarohan to the village of Poeloetan on the east coast, and at the northern end of the area another path connects the village of Beo to the village of Rainis.

(*d*) *Beo Bay beach.* (PLAN 21, Section M(d)) Reliability POOR. An extensive mud and sand beach, coral sand occurring near the southern end of the area, lies along the shore of Beo Bay, 4° 14′ N, 126° 49′ E, on the western shore of Karakelong Island. Landmarks for the area include a pier which extends over the reef to deep water in front of Beo village; a light which was shown from the head of the pier; and a conspicuous tree which stands on the shore northeast of the village. The approach to the beach in this area is clear to the 30-foot depth but shoreward it shoals rapidly from 10 feet to 3 feet. The most extensive shoal area is found in the northern part of the bay (FIGURE IV - 62). During westerly winds a swell and heavy surf are experienced in the bay. The tides are both diurnal and semidurnal with the latter predominating. Neither the spring highs nor spring lows coincide. The highest water level occurs in April or May and in October or November; the lowest in January or February and in July or August. The maximum rise and fall that can be expected are about 3 feet above and 3 feet below mean sea level.

The beach at the northern end of the bay is wide and is composed of mud and sand, but toward the south the beach narrows and the quantity of coral sand increases until a coral sand beach exists in front of Beo village. Here there is a stone pier which extends 426 feet across the fringing coral reef. There are 5 feet of water at the outer end. Just east of the village a stream crosses the beach. The best place to land is near the village. Behind the beach there is a coastal plain which slopes gently inland along 3 stream valleys. Between the valleys the plain rises inland along moderate slopes to the hills of the interior. The coastal trail lies immediately behind the beach. At the village a path trends eastward across the island to the village of Rainis.

(*e*) *Lobo—Awit segment beaches.* (PLAN 21, Section M(e)) Reliability POOR. Three possible landing beaches lie in the bight on the west coast of Karakelong Island between Lobo Point, 4° 16′ N, 126° 43′ E, and Anoelawalo Point, 4° 20′ N, 126° 41′ E. The best landmark for the area is 2 small islands which lie near the southern end of the area. The northernmost, Jolly Island, is identified by a conspicuous white monument. The approach to the shore of the bight is over a steep sand and stone bottom and is obstructed by 2 islets and a number of charted shoals. Most of the shoals lie near the southern end of the area. Occasionally heavy seas are experienced during the north monsoon. The beaches are composed of coral sand with patches of mud and stone occurring locally near the southern end of the area. The best places to land are in front of the villages of Lobo, Rae, and Awit. The largest stream of the island empties into the ocean between the villages of Rae and Lobo. The land behind the beaches consists of a moderately wide plain near the limits of the area but near the center it extends inland for a number of miles where it finally rises along steep slopes to the crest of the chain of mountains which occupies the center of the island. The coast trail lies immediately behind the beaches.

(*f*) *West coast beaches, northern segment.* (PLAN 21, Section M(f)) Reliability POOR. A number of possible landing beaches lie at the heads of the bights in the high steep northern portion of the west coast of Karakelong Island between Point Batoebahewa, 4° 20′ N, 126° 41′ E, and Point Ambora-besar, 4° 33′ N, 126° 45′ E. In general the approach to this stretch of coast is clear to the seaward edge of the fringing coral reef which is reported to be widest in the bights. All of the beaches in this area are open to westerly winds and seas which occasionally become violent during the north monsoon. Currents are often strong in Essang Bay after heavy rains. The beaches in this area are composed mainly of coral sand and are narrow, steep, and firm. The best place to land is near the stream mouths where the reef is generally narrowest. The land behind the shore is in general high and steep, but near the bights the hills draw away from the coast. The coastal path lies immediately behind the beaches.

N. Talaud Islands: Salebaboe Island.

(1) Offshore zone.

With northeasterly and northwesterly winds there is a little swell in offshore waters. The flood stream sets to the northward; the ebb stream sets to the southward. Kaboeroeang Strait, between Salebaboe Island and Kaboeroeang Island, is 2¼ miles wide at its narrowest part and is clear, except for a 2¼-fathom shoal lying ¾ mile off the northwestern end of Kaboeroeang. Strong currents have been experienced in this strait.

(2) Coastal topography.

Salebaboe, southwest of Karakelong, is about 15 miles in length, and may be recognized easily by a saddle-like formation of the hills at the middle of the island. These hills are densely wooded (FIGURE IV - 63) and have beaches of sand, varied here and there by large rocky lumps of coral. The island is surrounded by a very narrow shore reef, which widens out somewhat at the northern end and on the southern half of the eastern coast.

The west coast is rocky and steep, with projecting rocky points. Near Moronge village, on the east coast, the land is low and swampy. The villages of the island are located near the coast and are connected by a road. It should be noted that Plan 22 shows this road as a horsepath, possibly not trafficable for motor vehicles.

There are probable landing places on the west coast of Salebaboe from Sere northward to Kalongan, and on the east coast from Aloede southward to Bitoenoersis.

(3) Anchorages.

Salebaboe anchorage is on the east coast in a small bay 2½ miles southwest of Moronge. The greater part of the bay is choked by the wide reef that extends from the shores on all sides. There is anchorage in a clear space at the middle, but this area is very limited in extent. Vessels could also anchor off the bay in 16 to 27 fathoms, clear of the shoals fronting the shores in the approach to the bay. The village of Salebaboe lies at the northwestern corner of the bay and that of Batu at the southwestern corner.

During northeasterly winds, vessels will find anchorage in the bay at the village of Sere, at the middle of the west coast of Salebaboe, where the depths are 50 to 55 fathoms.

FIGURE IV - 63. *Talaud Islands. E coast of Salebaboe Island, Liroeng.* Looking SW toward beach and village. 1939.

There is anchorage off the village of Kalongan at the northwestern end of the island. This anchorage has depths of 22 to 27 fathoms, but is sheltered only from easterly winds. A 2¾-fathom shoal lies about 650 yards off the rocky point north of the village.

(4) Dangers to navigation.

Liroeng Strait, the channel separating Karakelong from Salebaboe, is 1½ miles wide at its narrowest part, but several shoals and the 2 islets, Sara ketjil (Little Sara) and Sara besar (Great Sara), lie in its southern part (FIGURE IV - 64). Between the 2 islets and the southwestern extremity of Karakelong lie several shoals of 4¼ to 10 fathoms, and other shoals lie up to 1⅓ miles northeastward of the islets; the outer shoal, off Sara Besar, has a depth of 10 feet. In mid-channel, off Salebaboe Island, lies a rock with a depth of 2½ fathoms over it.

(5) Landing beaches.

(a) Aloede—Moesi segment beaches. (PLAN 22, Section N(a)) Reliability POOR. Possible landing beaches lie in front of the villages Aloede, 4° 00′ N, 126° 39′ E, and Moesi, 3° 57′ N, 126° 40′ E, on the east coast of Salebaboe Island, which is separated from Karakelong by Liroeng Strait. The approach to the area is obstructed by a number of charted shoals in the eastern entrance to Liroeng Strait. Nearshore the approach to the beaches is over a steep coral sand bottom and is clear except for a shoal, least depth 26 feet, which lies about 1,600 feet southeast of the village of Aloede. The fringing coral reef at Moesi is very narrow, but at Aloede it becomes wide. The area is well protected from both monsoons, but currents caused by the semidiurnal tides can attain a velocity of 2 to 3 knots. The beaches are steep, narrow, and firm, and are composed of coral sand and debris. Immediately behind the beach there is a narrow plain which rises inland along moderate to steep slopes to the crest of a range of hills. Exit from the beach is along a horse path which connects the villages on the east coast of the island.

(b) Liroeng beach. (PLAN 22, Section N(b)) Reliability POOR. An extensive beach lies on the east coast of Salebaboe Island in front of the village Liroeng, which is situated at 3° 56′ N, 126° 41′ E. Landmarks for the beach include the saddle-like formation of the hills west of the beach and the 2 Sara islets northeast of the beach, of which the northern is low and swampy and the southern is surrounded by a fringing coral reef backed by a white coral sand beach. The approach to the Liroeng beach is over a sand bottom but is obstructed by the Sara islets and by numerous charted shoals. Shoreward of these dangers the approach to the beach is obstructed by great quantities of rock which are strewn over the reef. The entire area is well protected from the winds and seas of both monsoons. The tide is both diurnal and semidiurnal with the latter predominating. Neither the spring highs nor the spring lows of the 2 tides coincide. The highest water level occurs in April or May and in October or November; the lowest in January or February and in July or August. The maximum rise and fall of the water surface that may be expected are about 3 feet above and 3 feet below mean sea level. The currents off the beach caused by the semidiurnal tides set northwestward along the coast at or about the time of high water and southeastward at or about low water with a velocity that often reaches 3 knots.

The beach in this area is extensive. It is firm, narrow, steep, and composed of coral sand and coral debris. The best place to land is near the flagpole in front of the *posthouder's* house, where the beach is clear of rocks. A stream crosses the beach near the northwestern end of the village. Immediately behind the beach there is a narrow coastal plain which rises a short distance inland along the steep slopes of the mountains that surround the village on all but the southeast side. There the hills swing westward away from the east coast and the plain becomes extensive. The main road of the island which connects the villages on the east coast passes through the village. In addition to this road a trail leads inland across the hills to the village Balang on the west coast.

(c) Moronge—Bitoenoeris segment beaches. (PLAN 22, Section N(c)) Reliability POOR. Possible landing beaches lie on the southern portion of the east coast of Salebaboe Island between the villages of Moronge, 3° 54′ N, 126° 43′ E, and Bitoenoeris, 3° 51′ N, 126° 42′ E. The approach to this stretch of coast is over a hard bottom, and is obstructed by numerous charted shoals over which the seas occasionally break heavily. Nearshore the entire area is lined by a wide fringing coral reef. The beach immediately behind the reef is composed of coral sand and debris. It is narrow, firm, and steep. The best places to land are in the vicinity of the villages. The land behind the

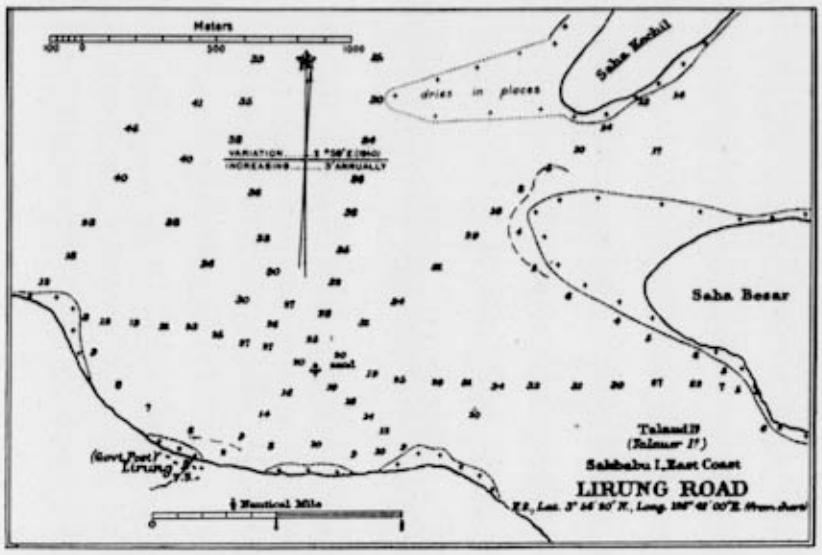

FIGURE IV - 64. *Talaud Islands. E coast of Salebaboe Island. Liroeng Road.*
Section from HO chart 3061.

beach at the northern end of the area is composed of an extensive marshy plain. Southwestward the plain dries, narrows, and rises a short distance inland along moderate slopes to the hills which occupy the southern end of the island. The main coastal road, which connects the villages on the east coast of the island, lies immediately behind the southern half of the area, but northward it swings about ½ mile inland between the villages Salebaboe and Moronge. In addition to this road a trail runs north from Salebaboe village to Balang village on the west coast.

(d) Sere—Kalongan segment beaches. (PLAN 22, Section N(d)) Reliability POOR. Two possible landing beaches lie on the west coast of Salebaboe Island at the villages of Sere, 3° 56′ N, 126° 39′ E, and Kalongan, 4° 01′ N, 126° 37′ E. The approach to these beaches is clear except for a 16½-foot shoal which lies about 1,950 feet off the rocky point north of Kalongan village. A fringing coral reef exists in front of both villages. During the north monsoon heavy seas occasionally impinge on the shore. The beaches are composed of coral sand and are firm, narrow, and steep. The best place to land at Kalongan is south of the village where there is a wide break in the reef and a gently sloping sand bottom. At Sere the best place to land is in the bay just west of the village where the reef is very narrow. The land behind both beaches consists of a narrow plain which rises inland along moderate slopes to the hilly interior. The villages in this area are connected by a trail which follows the coast and swings inland at Sere village connecting to Liroeng and Salebaboe on the east coast of the island. Kalongan, the northern village in the area, is the terminus of the road which serves the villages on the eastern coast of the island.

O. Talaud Islands: Kaboeroeang Island.

(1) Offshore zone and dangers to navigation.

Northumberland Rock, 6 miles south-southeast of Kaboeroeang, is a small islet, about 6 feet in height, composed of broken coral. It is surrounded by a reef with drying rocks. A 2¼-fathom shoal lies ¾ mile off the northwestern end of Kaboeroeang. A 1½-fathom patch lies south of Peret, a village 1¼ miles northwest of the southern extremity of the island and a 2¼-fathom shoal in Kaboeroeang Strait.

(2) Coastal topography.

Kaboeroeang, the southernmost of the Talaud Islands, is 8½ miles in length and has 2 conspicuous summits, 1,328 and 1,578 feet in height, respectively. In general the coast is rocky, but broken in places by sandy beaches. The coast reef is narrow and steep-to.

There are probable landing places on Kaboeroeang Island from Boeloede southward to Point Palle, and from Point Palle northward on the east coast to Point Pelet.

(3) Anchorages.

There are no recommended anchorages along the coasts of this island. Vessels can find anchorage during calm weather, but more than 100 yards off the edge of the coastal reef depths of over 45 fathoms will be found. Exceptions to this are a 1½-fathom patch close off Peret, a village 1¼ miles northwest of the southern extremity of the island, and the 2¼-fathom shoal in Kaboeroeang Strait.

(4) Landing beaches.

(a) Mengarang beach. (PLAN 22, Section O(a)) Reliability POOR. A landing beach lies in front of the village of Mengarang, 3° 49′ N, 126° 45′ E, on the west coast of Kabaroeang Island. The village, which is one of the largest in the Talaud Islands, is recognized by its extended, straggling arrangement and its avenue of coconut trees. The approach to the beach is clear to the steep-to fringing coral reef. Wave action is severe on the beach during strong westerly winds. Strong currents have also been experienced in this vicinity. The water temperature is always greater than 70° F. The beach, which lies at the inner limit of the reef is narrow, firm, steep, and composed of coral sand and debris. A stream crosses the beach

near the southern end of the village. The area behind the beach is a narrow coconut-covered plain which rises inland along steep slopes to the hills of the interior. A road, shown on most maps as only a horsepath, completely encircles the island close to shore and passes through the village.

(b) Boeloede—Peret segment beaches. (PLAN 22, Section O(b)) Reliability POOR. Possible landing beaches lie on the west coast of Kabaroeang Island, south of Mengarang village, between Boeloede village, 3° 47′ N, 126° 46′ E, and Point Palle, 3° 44′ N, 126° 50′ E, the southernmost point of the island. The approach to this stretch of coast is clear to the seaward edge of the fringing coral reef, except close off the village Peret where there is a shoal, least depth 9 feet. The area is exposed to southerly and westerly winds and seas. The beaches at the inner limit of the fringing reef are firm, narrow, steep, and composed of coral sand. Streams cross the beaches near the villages of Boeloede, Pangerang, and Peret. The best places to land are near the stream mouths where the reef is usually the narrowest. The land behind the northern and southern beaches consists of a moderately wide plain, but near the center of the area the hills of the interior approach close to the coast and descend along steep slopes to the narrow coastal plain. A "road" which encircles the island lies close behind the beaches.

(c) Kabaroeng — Birang — Damaoe segment beaches. (PLAN 22, Section O(c)) Reliability POOR. Possible landing beaches lie o nthe east and south coast of Kabaroeang Island in front of Kabaroeang, Birang, Akas, and Damaoe villages. The approach to this stretch of coast is clear to the narrow fringing coral reef which is steep-to. During the north monsoon seas break heavily on the coral reef. The beaches are composed mainly of coral sand. They are narrow, steep, and firm. Rocks exist on the reef south of Kabaroeang village and at Damaoe village on the south coast coast of the island. Streams cross the beaches near the villages. The best places to land are near the stream mouths. Near the northern end of the area there is a narrow coastal plain behind the beach which rises along moderate slopes to the hilly interior. Southeastward the hills recede from the coast and the plain becomes more extensive. The coastal road lies immediately behind the beaches.

43. *Mindanao*

A. Surigao Area: Claver Point to Cog Point.

(PLAN 23; FIGURE IV - 293; U.S.C. and G.S. charts 4603 and 4629)

(1) Offshore zone.

In this segment of coast, lying 11 miles to 22 miles southeast of Surigao (PLAN 23), the 10-fathom curve lies less than $\frac{1}{10}$ mile to 1¼ miles offshore. This line is nearest to the coast along the south side of Cog Point and farthest from shore in Becebos Bay west of Claver Point. The 20-fathom line, ⅛ mile to 2¼ miles from the coast, also is closest to shore off Cog Point, but attains a maximum distance offshore both off Becebos Bay, and in the large bight between Gigaquit and Placer. Beyond the 20-fathom curve, but within 5 miles of shore, the water deepens gradually to a maximum of 39 fathoms north-northeastward from Claver Point.

The bottom sediments immediately offshore consist of a narrow, discontinuous belt of sand and coral debris, which is of highly variable width. This zone grades rapidly into the muds of the deeper waters.

(2) Coastal topography. (U.S.C. and G.S. chart 4629)

From Claver Point a coastal plain having a maximum width of approximately 5 miles extends westward for 6 miles to the town of Bacuag. The shore line is generally sandy, and between Gigaquit and Placer is bordered by a 25-foot limestone bluff. The flat is covered with woods and coconut groves, which are interspersed with small cultivated areas. It is crossed by a number of sluggish rivers, all of which have very little water over their bars, but which may be entered by a rowboat at low water. Steep, heavily timbered mountains rise behind the plain to elevations of 3,000 feet or more.

Claver Point is a narrow wooded promontory 106 feet high and about ½ mile long. Coconut palms mantle its southern or shoreward half. The Claver River discharges west of the point. The village of Claver, which is not visible from the sea, lies on the east bank of the river about ½ mile above its mouth. The river is very narrow and shallow above the town, and is lined with mangroves for about 1½ miles from its outlet.

The Magallanes River discharges approximately 1 mile westward from the Claver River. It is connected with the Gigaquit River on the west by a distributary channel, which is used by native craft during rough weather.

Byby Island, separated from the mainland by the channels of the Magallanes and Gigaquit Rivers, is a low, flat, alluvial delta, which is largely covered by mangrove and nipa swamps. Small groves of coconuts fringe the northern and southern shores of the island.

Cabgan Island, located about ½ mile northward from Byby Island, rises to a height of 178 feet and is covered with cogon grass and coconut palms. It is surrounded by a fringing coral reef which extends about ½ mile northwestward. The reef is usually marked by breakers.

Gigaquit is a village lying on the south bank of the Gigaquit River, about 1 mile above its mouth. The village is faced by a long, narrow sand spit which projects westward from Byby Island and forms the northern side of the river down to its outlet. Mangroves line the sides of the river from the village to a point about ¾ mile upstream. A narrow channel, 3 feet deep at low water, leads across the bar at the river's mouth.

There is very little water in the river above Gigaquit, but a boat passage from the Gigaquit River to the Magallanes river, and thence into the Claver River, is reported to exist.

Shoal water extends to a considerable distance in this vicinity, with the 10-fathom curve lying about ¾ mile from shore.

The mouth of the Alambique River adjoins and lies immediately westward of the mouth of the Gigaquit River. The Alambique is surrounded by a large mangrove swamp which extends at least 2½ miles upstream and reaches westward along an abandoned distributary channel to the Bacuag River.

The village of Bacuag lies a short distance eastward from the mouth of a small mangrove-lined stream known as the Tenanan river. Rolling, wooded foothills rise from the coastal flat less than ½ mile behind the town.

Shoal water, 1½ fathoms at its outer edge, extends about ½ mile from the mouth of the Tenanan River, and surrounds Puyo Rock, which is large and conspicuous.

The coast between Bacuag and Placer is largely occupied by a narrow mangrove swamp, which is surrounded by timbered hills from which spurs extend seaward. The swamp is separated

from the ocean by a narrow strip of coconut and brush-covered land.

The village of Placer lies on a blunt point at the foot of a steep wooded ridge which projects from the coastal mountains. The harbor is formed by a large reef, bare at low water, which extends about ⅜ mile northeastward from the town and surrounds Bancay Rock.

A very small mangrove-covered flat lies immediately westward from the town. Thence to Cog Point, about 1 mile northward, steep forested hills, locally fringed by mangroves or coconuts, rise almost directly from the water's edge (FIGURE IV - 65).

FIGURE IV - 65. *Surigao area, SE of Surigao.*
Inside passage between Surigao and Placer. 1939.

(3) Anchorages.

The only good anchorage along this section of the coast is in the harbor at Placer, for the description of which see Chapter VI.

(4) Dangers to navigation.

There is a small rocky shoal of 3½ fathoms lying about ⅜ mile north-northeastward from Cabgan Island. A still smaller rocky 8-fathom patch occurs nearly 1½ miles northeastward from the island.

A small shoal, covered by a least depth of ½ fathom, lies nearly in the middle of the harbor at Placer, about 450 yards northward from Bancay Islet.

(5) Landing beaches.

(a) Placer beach (PLAN 23, Section G (d)) Reliability POOR. A sand beach about a mile long, interrupted by a rocky point, lies in front of and south of the village of Placer. The limits of the beach are 9° 39′ 35″ N, 125° 36′ 10″ E, and 9° 38′ 30″ N, 125° 36′ 15″ E. The rocky point that interrupts the beach is conspicuous by its narrowness and its height of 499 feet. The beach lies near the entrance to Canal Bay, and its northern part is fronted by a fringing coral reef of a maximum width of about 3,000 ft. The bottom slopes are steep to moderate, becoming somewhat gentler before the southern part of the beach. Bottom materials are mainly coral mud and sand. The mean tidal range is about 5 feet; the flood tidal current moves northwestward along the beach.

The northern part of the beach is muddy and flat, and is locally too soft for landings. The southern part of the beach is composed of sand; it has a slope of 1 on 25 and is firm. The beach as a whole is protected from northeast waves by Masapelid Island. Shore drift is weak and variable, but probably is predominantly toward the southeast. The only structure along the beach is a stone pier near the northeastern edge of the town. The beach fronting the town lies at the base of moderately steep slopes and is backed by a road on an embankment. The southern part of the beach lies on a small plain behind which, about ¼ mile inland, runs a road that extends southeastward as far as Claver and runs westward from Placer to connect to the highway to Surigao. The terrain adjacent to both ends of the beach is locally mangrove covered. The interior is generally jungle covered, but the southern part of the beach lies in front of an area of coconut palms.

(b) Cog Point beaches (PLAN 23, Section G(c)) Reliability POOR. Two small beaches occur adjacent to Cog Point. The first lies 1 mile northwestward at the village of Bobon, and the second lies about ½ mile southwest of the point. The point is situated at 9° 40′ 35″ N, and 125° 36′ 30″ E. The beaches are each about ¼ mile long, and narrow. Landmarks for the area are Cog Point which lies in the shelter of Masapelid Island, an island with a hill 684 feet high near its southern end. The approach to the beaches is by way of Canal Bay; the nearshore bottom slopes are steep and the beaches are fronted by fringing coral reefs. Bottom materials are mainly mud.

The mean tidal range is about 5 feet. The flood tidal current moves northwestward through Canal Bay. Tide rips and eddies occur in the narrow channel between Cog Point and Dinago Island.

The beaches are composed of firm coral sand and have moderate slopes. The northern beach lies at the southern edge of a coastal plain which widens northward, is penetrated by several inlets, and is covered with dense mangrove. The southern beach lies at the mouth of a small stream at the base of moderate slopes, jungle covered, leading inland to a hill 715 feet high, within a mile from shore. A trail extends relatively close to shore from the village of Taganaan, southward past Bobon and the southern beach to the settlement of Placer farther south.

B. Surigao Area: Nagubat, Masapelid, Hinatuan, Bayagnan and adjacent islands.

(PLAN 23; U.S.C. and G.S. charts 4603 and 4629)

(1) Offshore zone.

The 10-fathom line, lying a few yards to about ½ mile offshore, is farthest from the coast off the southeastern extremity of Masapelid Island. In general the 20-fathom curve roughly parallels the 10-fathom line at a distance of a few yards to ⅜ mile beyond the latter. A narrow bank under 17 to 19 fathoms extends westward into Canal Bay from the southern part of Masapelid Island. Within a zone 5 miles from shore a maximum depth of 52 fathoms occurs eastward from Sili Point at the southern extremity of Hinatuan Island.

The bottom sediments around the islands are predominantly sand or sand mixed with marine shells. Patches of coral limestone or coralline debris are present locally. The sand zone grades into mud in the southern part of Canal Bay and eastward from Hinatuan Island.

Strong tide rips and tidal eddies are prevalent in Masapelid Passage west of the islands and in the portion of Hinatuan Passage northward from the islands.

(2) Coastal topography.

Nagubat is a small island, 172 feet high, lying about 3½ miles northward from Gigaquit, near the middle of a narrow reef which is about 1½ miles long, north—south.

Dijut Rock, 38 feet high, stands on the same reef with Nagubat Island, and lies ¾ mile north-northwestward from it. A lone coconut tree grows on its summit. The rock is surrounded by several smaller rocks and forms a conspicuous landmark. There

is a 3½-fathom channel across the reef midway between Nagubat Island and Dijut Rock.

Bonga Island, lying about ¾ mile eastward from the south part of Masapelid Island, is about 600 yards in extent. It is bold on the east side, heavily wooded, and 325 feet high. The island is surrounded by a reef which extends about ½ mile southward.

Mahaba Island lies close to the east side of Masapelid Island, from which it is separated by a narrow, deep channel. The southern and better entrance to this channel is marked by 2 small islets, one on the Masapelid Island reef and the other on the Mahaba Island reef. Mahaba is heavily wooded, with scattered coconuts near the eastern shore. The island is fringed with coral reefs, which on its eastern and southeastern sides extend outward ¼ to ½ mile.

Masapelid Island is about 4 miles long north-northwest—south-southeast, and has a greatest width of about 2½ miles. The western part is very rough and heavily wooded, with many small peaks. The northeastern portion is also hilly, but is covered with grass and scattered trees. The southern part consists of a rolling ridge which is heavily wooded on its western side. Considerable cogon grass and a great number of dead trees cover the eastern slopes of the ridge. The highest point on the island, 684 feet, lies near its southern end. The village of Lakandola lies on Canal Bay, near the southwest end of Masapelid Island (FIGURE IV - 66).

Canal Bay, a large indentation on the southwest side of Masapelid Island, is 2½ miles wide at its entrance and extends about 2 miles northward.

Opong and Dinago Islands are 2 small wooded islands, 402 and 416 feet high, respectively, lying in the western part of Canal Bay. The islands consist of rough, jagged coral limestone. Marine erosion at the water line has given them a mushroomed appearance.

Close to the eastern side of Dinago is a very small islet rising to 2 summits, 120 and 125 feet high.

Caye Island is a small island lying about ½ mile north of Masapelid Island and close to the shore reef that extends southeastward from Bilabid Island. Its western side is bordered by mangrove, and its eastern side by a sandy beach. The island is 269 feet high to the tops of the trees. Very deep, narrow channels occur between it and the neighboring islands of Bilabid and Masapelid.

Bilabid Island, lying close to the southwestern side of Bayagnan Island, from which it is separated by a narrow, foul mangrove slough, is about 2 miles long on a north-northeast axis, and 1 mile wide. The eastern part is largely covered with grass and scattered coconuts. A very prominent clump of green trees caps the highest point which has an elevation of 298 feet to the tops of the trees. The remainder of the island is mostly mangrove swamp.

Bayagnan Island, lying 2 miles westward from Hinatuan, is about 3 miles long northwest—southeast and very narrow near the middle. It presents an irregular sky line with 2 low passes, 15 to 20 feet high, dividing the island into 3 distinct parts. Telegraph Mountain, the sharp peak on the southern part, is covered with tall trees, rises to a height of 827 feet and forms a conspicuous landmark for miles around. San Jose, the most important settlement, is situated on San Jose Point, the southeastern extremity of the island. Bayagnan is fringed by reefs which at some points extend to a distance of ⅔ mile and surround a number of rocks and small islets.

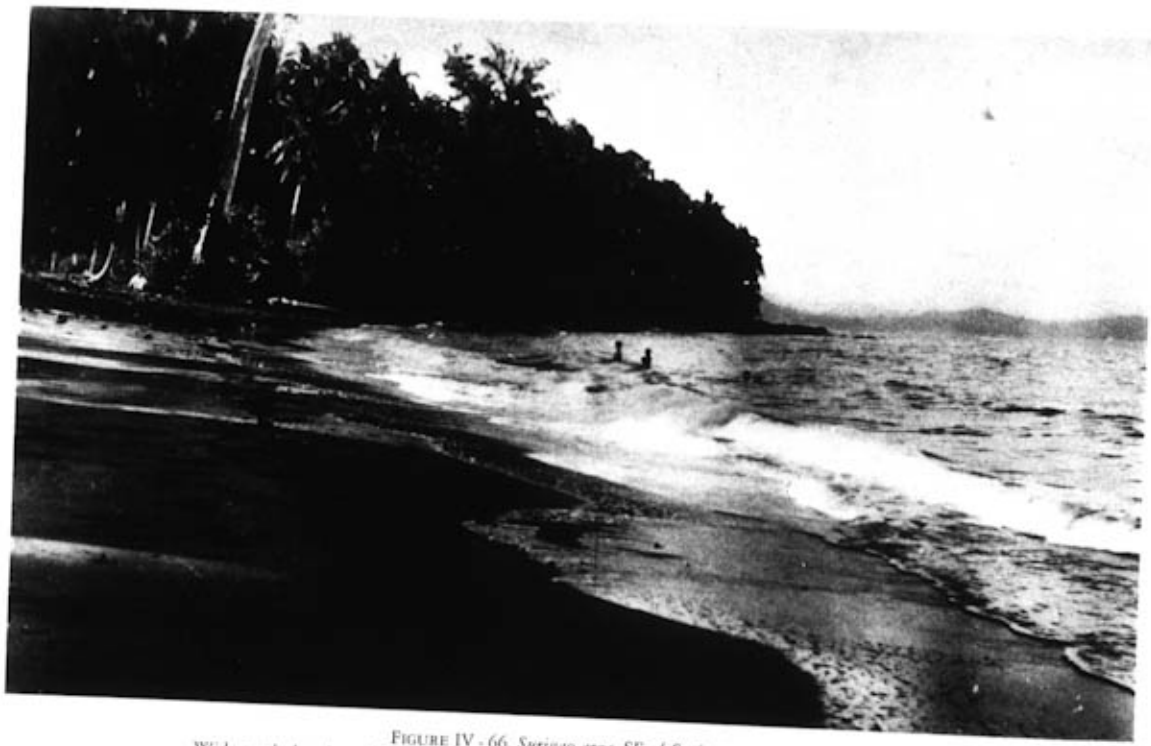

FIGURE IV - 66. *Surigao area, SE of Surigao.*
Wide sandy beach at Lakandola near S end of W coast of Masapelid Island, looking E. 1938.

Sugbu and Sugbu Diutay Islets are 2 small, unimportant islets lying on the reef which extends nearly ¾ mile eastward from the northern part of Bayagnan Island. Sugbu, the eastern and larger islet, is 214 feet high. The northeastern part is wooded, but the remainder is covered with grass and palms. Although the eastern shore terminates in rocky ledges, the southern and western shores are flanked by sandy beaches. Sugbu Diutay lies between Sugbu and Bayagnan and does not require any detailed description.

Sagasae Islet lies on the reef which extends nearly ¾ mile southeastward from the southeast extremity of Bayagnan Island. Except for differences in shape this island is very similar in all respects to Sugbu Island. The northeastern portion is wooded and 175 feet high to the tree tops. The remainder is mantled by grass and palms. Rocky ledges line the eastern shore, while sandy beaches border the southern and western sides. The channel between it and Talavera Island is about ¼ mile wide, and is deep and clear.

Talavera Island, lying ¾ mile southwestward from Hinatuan, is about 1½ miles long east—west, 1 mile wide, and of very irregular shape. It is largely covered with coconut trees and grass, and rises to a height of 605 feet. The island is fringed by a narrow steep-to reef, which extends ¼ mile southward from its southwest point, and surrounds the sand islet of Bagumbanua. Talavera is well watered and partially cultivated. The village of Talavera lies on the north coast of the island.

Banug Islet is a small islet situated about ¼ mile northward from Talavera Island, from which it is separated by a deep, clear channel about 200 yards wide. It is formed by 2 hills joined by a low, palm-covered, sandy isthmus; the eastern hill is 130 feet high. The island lies on the south side of a reef which bares at low water, and is about ⅜ mile long, east—west, and ¼ mile wide.

Banug Strait, about ⅜ mile wide between the southwest point of Hinatuan Island and Banug Islet is straight and deep.

Hinatuan Island is 3½ miles long, north and south, 2½ miles wide, and irregular in shape. It is surrounded by a narrow, steep-to coral reef, which, at the northwestern extremity of the island, extends to a distance of about ¼ mile. Hinatuan forms a conspicuous landmark, appearing from a distance as 2 separate islands. The large southern portion is joined to the northern part by a narrow neck of land only about 30 feet high. The southern section, 1,135 feet high, is covered with sparse brush and woods through which large patches of bright red soil are exposed to view. The northern part is encircled by nearly vertical cliffs of dark rock, is heavily wooded, and rises to a height of 606 feet. The shores of the island consist principally of rocky ledges which are locally interrupted by a few short, sandy beaches.

(3) Anchorages.

A fairly good anchorage for small vessels may be found at the head of a small bay in the southwestern part of Talavera Island in about 24 fathoms, muddy bottom.

(4) Dangers to navigation.

Hinatuan Rock is a small rocky shoal, covered by a least depth of 3½ fathoms and surrounded by deep water. It lies about 4½ miles southeastward from Sili point, the southeastern extremity of Hinatuan Island, on the bearings, eastern extremity of Hinatuan Island 344° true, Nagubat Island 235° true, distant 4 miles.

Isa Reef, a small dangerous reef, covered by a least depth of 1¼ fathoms, lies about 1½ miles westward from Nagubat Island, in the fairway of vessels approaching Placer, Bacuag, and Gigaquit from the northward.

About 400 yards from the northwest side of Bonga Island there is a small ½ fathom shoal.

A small reef that bares lies ½ mile southeastward from the south point of Masapelid Island.

Canal Bay contains a number of small islands and dangerous shoals.

In the absence of local knowledge the use of Masapelid Passage is not recommended. It is narrowed in several places by dangerous reefs and shoals, and the tidal currents run with great velocity. Owing to its intricate channel and the absence of good landmarks, no directions for it can be given.

Dayan Reef is an extensive reef which lies immediately westward from the north end of Bayagnan Island. It is surmounted by a cluster of rocks rising about 7 feet above high water. A very narrow, deep channel, in which violent tidal whirls occur, separates the reef from Bayagnan Island.

(5) Landing beaches.

No data.

C. Surigao Area: Cog Point to Bilaa Point.

(PLAN 23; U.S.C. and G.S. charts 4603 and 4692)

(1) Offshore zone.

The 10-fathom line, lying a few feet to almost 1 mile offshore, fringes the north side of Lamagon Island and is farthest from the coast off Kapa Cove and Bilanbilan Bay. The distance of the 20-fathom curve varies from less than $\frac{1}{10}$ mile off the east side of Maanoc Island to 2½ miles off Kapa Cove and over 1½ miles off Bilanbilan Bay. Within a zone 5 miles from shore the depths do not exceed 56 fathoms and are generally much less, until the vicinity of Bilaa Point is reached; depths of 90 to 100 fathoms occur about 2 miles northward from the point.

The bottom sediments off this section of the coast consist almost entirely of sand, which often contains marine shells. A few patches of coral limestone or coralline debris occur in some localities, but only 1 mud patch, on the east side of Bilanbilan Bay, is shown on U.S.C. and G.S. Chart 4629.

Strong tide rips occur north of Cog Point, north of Lamagon Island and southeastward of Basol Island. Tidal eddies and whirls exist in Masapelid Passage and are particularly common in Hinatuan Passage eastward from Kabo Island.

(2) Coastal topography.

From the ridge west of Cog Point, a narrow, locally discontinuous coastal plain, up to 1½ miles wide, extends northwestward to the east side of the peninsula on which Bilaa Point is located. In places the plain is broken or narrowed by heavily wooded spurs projecting seaward from the mountains. Near the coast there are a few small, low, detached hills covered with cogon grass and coconut trees. The coast line of the plain is almost completely fringed with mangrove swamps, except for short coconut- or forest-bordered stretches northwestward from Cog Point and westward from Surigao. The woods and brush mantling the flat are interrupted in many places by small coconut groves or cultivated areas. The central portion of this section of the coast is bordered by a number of large, swampy, mangrove-covered islands, which are separated from the mainland and from each other only by very narrow, shallow channels.

Large deposits of magnetic iron ore occur in the mountains between Gigaquit and Mount Legaspi, and other deposits exist near Surigao and on the islands to the east and northeast. The compasses of vessels are greatly affected by these bodies and cannot be depended upon for navigating the waters of this vicinity.

Cog Point is a relatively low, rounded, conical island which is covered by brush and coconuts. It is separated from the mainland by a very narrow, mangrove-filled slough.

Bobon, a small village lying on the mainland abreast of Dinago Island, is located on the last strip of solid shore line between this point and Surigao.

Masapelid Passage connects Hinatuan Passage with Canal Bay. It is formed by Lamagon, Maanoc, and Condona Islands on the west, and Bayagnan, Bilabid, and Masapelid Islands on the east.

Most of the small native craft plying between Surigao and Placer pass through the Taganaan Estero, a narrow channel through the mangroves between Canal Bay and Panag Bay (FIGURE IV - 65). The boats thus save considerable distance, and must contend with a current of only about 2 knots instead of the much stronger currents in the Masapelid Passage.

Taganaan is a small village lying at the mouth of the Taganaan River, which discharges into the Taganaan Estero about 1¼ miles westward from Opong Island. The town is of little importance, as boats drawing more than 2 feet cannot reach it at low water.

From the eastern entrance to the Taganaan Estero the coast of the mainland trends in a general northwestward direction for about 8 miles to Surigao. It is much indented and bordered by mangroves which extend inland for a distance of 1 to 2 miles. Opposite the coast are numerous islands, which are covered largely with mangrove. These islands lie so close to the shore and to each other that they appear to be part of the mainland. The tide rises in the mangroves to a height of about 2 feet and many of the smaller islands have no solid ground. The islands are separated from the shore and from each other by a network of *esteros*, navigable only by small craft. Native boatmen utilize these *esteros* to save distance and to escape the rough weather and strong currents of Hinatuan Passage.

The principal mangrove or mangrove-bordered islands off this part of the coast are Kabo, Load, Lapinig, Lamagon, Bilabid, Maanoc, Cobeton, Cepaya, and Condona. Their sides facing the Hinatuan Passage are generally clean, steep-to, and free of dangers.

Low hills of very limited extent rise to heights of about 70 to 300 feet on most of the islands named. The hills are mantled with various combination of cogon grass, brush, coconut palms and tropical woods.

Bilanbilan Bay, lying immediately eastward from Surigao, is about 2 miles wide between the entrance points and extends approximately 1 mile southward. The small villages of Cagmug and Bilanbilan lie on its southern and western shores, respectively. The coastline surrounding the bay is low and heavily fringed with mangroves.

Surigao Light, 9° 47′ 08″ N, 125″ 30′ 00″ E, was exhibited 22 feet above high water from a square concrete tower. The tower is built on the edge of the fringing reef off Bilanbilan Point, the western entrance point to Bilanbilan Bay, and rises from the water about 90 yards from shore. This light can be passed fairly close-to, as the water deepens rapidly beyond it.

Surigao, the capital of Surigao province and the largest town in northern Mindanao, lies on an alluvial flat at the eastern side of the mouth of the Surigao River (FIGURES IV - 67 and IV - 68). It contains a number of large buildings and is prominent from seaward.

The Surigao River, discharging on the west side of the town of Surigao has about 1 foot on its bar at low water. The ruin of an iron bridge near the mouth prevents large boats from entering the river. About 1¼ miles above its mouth the Surigao river divides into 2 branches forming Bingad Island between them. The larger branch, known as the Tomanday River, flows northward, emptying into Hinatuan Passage about 1 mile westward from the mouth of the Surigao. The Tomanday has about ¼ fathom on its bar at low water; at high water small boats drawing not more than 5 feet can enter and ascend the river for a distance of about 1½ miles.

From the mouth of the Surigao River the coast trends westward for about 2 miles to the outlet of the Bioburhan River and thence northwestward about 2 miles to Bilaa Point. It is bordered throughout by a narrow, sandy beach fringed with coconut palms. For the first 2 miles the shore is backed by mangrove swamps; the remaining coast line is generally rocky and is flanked by jagged coral heads which extend 50 to 100 yards from shore. Beyond this fringing reef the water deepens rapidly. The peninsula behind the last 2 miles of coast consists of low, rolling, heavily wooded hills which rise a short distance inland.

Basol Island, lying about 2½ miles east-northeastward from Bilaa Point, is a prominent landmark for vessels bound for Surigao or the Hinatuan Passage. It is about 400 yards long, west-northwest—east-southeast, and 200 yards wide. The eastern three-fourths is low, covered with coconuts, and bordered by a sandy beach; the western fourth is higher and wooded, with a rocky shore line. The island is fringed by a narrow, steep-to coral reef, which, off the northern side, extends to a distance of about 400 yards.

(3) Anchorages.

For anchorages off Surigao see Chapter VI.

During the southwest monsoon, anchorage sheltered from the tidal streams may be found on the slope of Bilaa Shoal.

(4) Dangers to navigation.

Bilaa Shoal, composed of sand and dark coral heads, and covered by a least depth of 2 fathoms, lies ¾ mile northward from Bilaa Point. Its position is usually indicated by tide rips. The shoal is separated from the point by a deep channel over ½ mile wide.

A shoal covered by a least depth of ¼ fathom exists about 1¼ miles eastward from Surigao Light. Vessels bound eastward should stand well off this shoal before shaping a course for Rasa Light.

Kabo Reef is a small reef covered by a least depth of 2½ fathoms lying a good ½ mile northward from the nearest point of Kabo Island and 2¼ miles 282° true from Rasa light.

(5) Landing beaches.

(a) Surigao beach. (PLAN 23, Section G(b); FIGURES IV - 67 and IV - 68) Reliability FAIR.

1. Location and extent. This beach extends for about a mile southeastward from the Surigao River past the town to the wharves of Port Surigao, then southwesterly to the end of a low spit. The limits of the beach lie at 9° 47′ 30″ N, 125° 29′ 30″ E, and 9° 47′ N, 125° 29′ 50″ E. The beach varies in

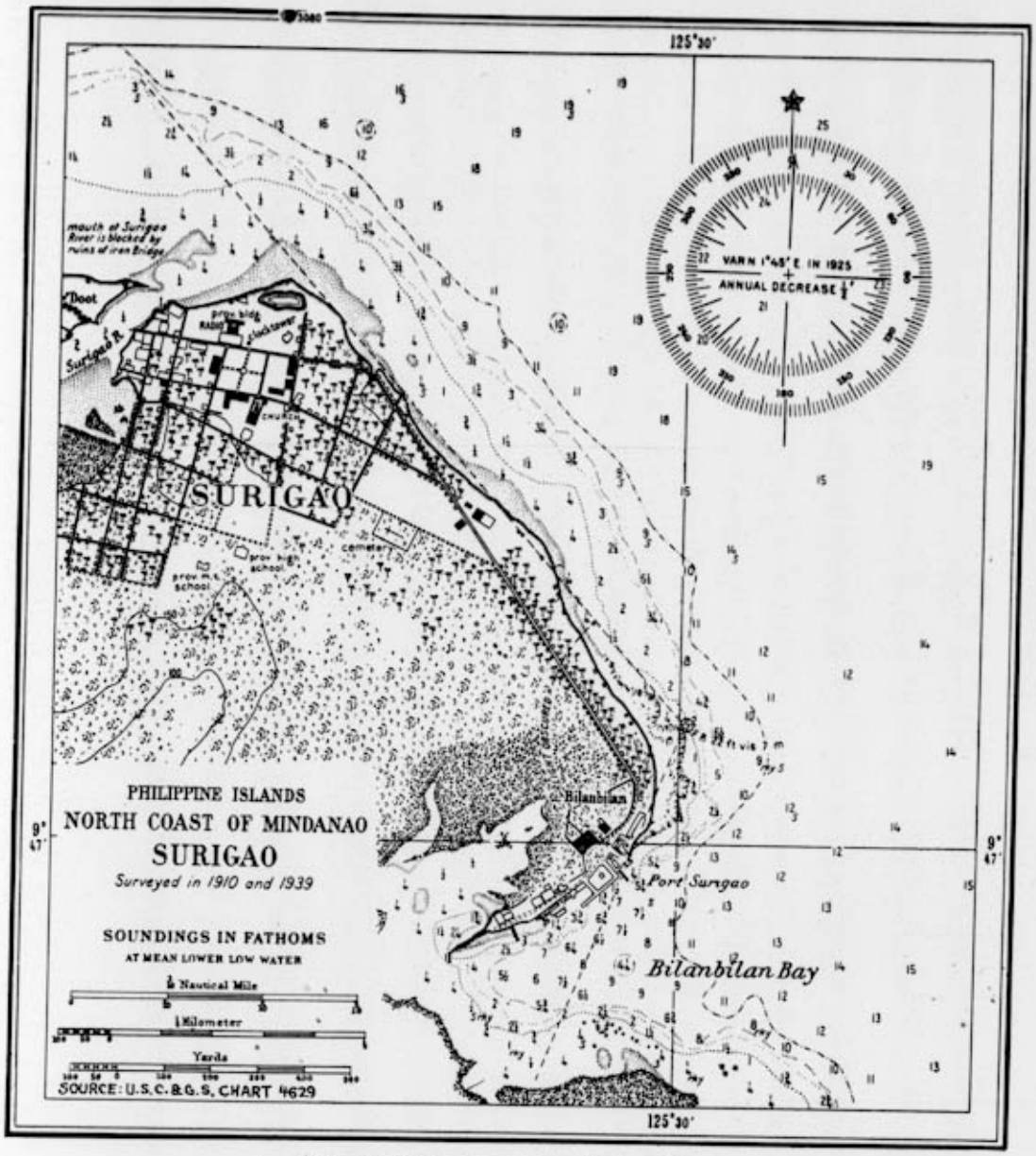

FIGURE IV - 67. *Surigao area, town and port of Surigao.*
Insert chart from U.S.C. and G.S. chart 4629.

width along its extent, attaining a maximum of about 300 feet at low tide and about 100 feet at high tide. The town of Surigao is readily recognized. A light was shown from a square concrete tower, 22 feet high, east of the town. The wharves of Surigao are located near the eastern part of the beach at the mouth of Bilanbilan Bay.

2. Nearshore. (FIGURE IV - 67) The offshore approach to this beach is clear. The bottom slopes are gentle to moderate along the western part of the beach at the mouth of the Surigao River and steepen gradually toward the southeast. Near the southeastern end of the beach a coral reef extends along the shore for a distance of about 1,500 feet from the wharves. This reef has a maximum width of nearly 300 feet. The bottom slopes become more gentle opposite the harbor and southwestward along the sand spit. Bottom materials consist mainly of sand and mud, with coral debris near the southeastern end.

The northeast monsoon begins in September. Northerly gales occur in December. In January, winds are northeast and are accompanied by heavy rain. Easterly winds prevail during the next 2 months, whereas from April to June the winds are

from the southeast, swinging to the southwest from July to September. Tidal currents move westward on the flood and eastward during ebb. Waves approach generally from north through east. The mean range of the tide is approximately 5 feet.

3. Character of beach. The northwestern end of the beach in the vicinity of the mouth of the Surigao River is a mixture of soft mud and sand, which grades into a fine yellow sand farther southeastward in front of the town. The beach here is flat and soft. For a distance of about 1,200 feet, beginning about 1,500 feet north of the Surigao wharves, the beach is fronted by a coral fringing reef and is composed of coral sand and coral debris. The slope of the beach in this vicinity varies from 1 on 6 to 1 on 10, and the beach is generally firm. Near the southeastern end of the beach at Port Surigao, there is a reinforced-concrete wharf with 20 to 30 feet of water alongside. Several smaller wharves, located on both sides afford facilities for smaller boats. Southwest of the wharves the beach continues for about 600 feet, terminating in a low sand spit. This portion of the beach is generally narrow and locally may be soft. A groin or jetty interrupts this part of the beach near its northeastern end.

When waves are running, surf occurs in a wide belt along most of the beach, but the intensity of the surf is lightest along the southeastern end in Bilanbilan Bay. Shore drift is to the southeast along the main beach. Fish traps are found throughout the length of the beach.

4. Adjacent terrain and exits. The entire beach is backed by low ground, and the town of Surigao lies immediately behind the northern half of the beach (FIGURE IV - 68). Southeast of the town the beach is backed by a fringe of coconut palms; an area of mangrove swamp occurs along the shores of the small bay enclosed by the spit and along the short inlet behind the wharves and warehouses at the piers. About ½ mile inland southwest of Surigao, the land rises gently to low, heavily-wooded hills. A road, lined with coconut palms and houses, runs from Surigao southeast to the port, generally parallel to the beach and about 200 feet inland. Exit to it is available from any part of the beach. A main well-surfaced road runs southeastward from town to Badas, where connections are provided to the northeast coast at Placer, and southward to Lake Mainit. Most of the terrain followed by the road is a broad level river plain.

Facilities at Surigao include a radio station and water.

(b) Bilaa Point beach. (PLAN 23, Section G(a); U.S.C. and G.S. charts 4603 and 4629)

1. Location and extent. A narrow sand beach, interrupted by 3 streams, extends southeastward from Bilaa Point for 4½ miles. The limits of the area are 9° 49′ 35″ N, 125° 26′ E, and 9° 47′ 30″ N, 125° 29′ 30″ E. Landmarks for the beach include Bilaa Poilnt, a dark rocky point which is the northern termination of a mountain range. Just beyond the eastern end of the beach, across the Surigao River, is the town

FIGURE IV - 68. *Town of Surigao.*
Surigao River, town, and shore fronting Hinatuan Passage, looking northwestward toward Bilaa Point. 1935.

of Surigao, which lies on low land. A light was shown from a square concrete tower, 22 feet high, east of town.

2. Nearshore. The offshore approach is clear except for Bilaa Shoal and Basol Island which lie about 1 mile north and 3 miles northeast of Bilaa Point, respectively. The 30-foot depth lies relatively close to shore along the point and for some distance southeast, the bottom slope is steep along the western part of the beach and becomes more gradual toward the east. A fringing coral reef extends from Bilaa Point southeastward nearly to the mouth of the Bioburhan River. Bottom materials are coral sand and debris in the west, grading to non-coral sand and mud farther east.

In this area the northeast monsoon begins in September. Northerly gales occur in December. January winds are northeast and are accompanied by heavy rain. Easterly winds prevail during the next 2 months, whereas from April to June the winds are from the southeast, swinging to the southwest from July to September. Tidal currents move westward on the flood and eastward during ebb. Waves approach generally from north through east. The mean range of the tide is approximately 5 feet.

3. Character of beach. The western part of the beach from Bilaa Point to the mouth of the Bioburhan River is narrow, and along most of its extent it is fronted by a fringing coral reef generally less than 500 feet wide. This part of the beach is relatively firm; its slope varies from 1 on 6 to 1 on 10. The composition of the beach is mainly coral sand, with some intermixed non-coral sand and pebbles in the vicinity of the point. The remainder of the beach to the eastward is also relatively narrow, but, as far as information goes, is not fronted by a coral reef. The beach slopes here are less steep than farther west, and the beach is locally soft, especially near the river mouths. The beach material is mainly non-coral sand, locally muddy. There are no groins or other structures along this beach. The several interruptions of the beach are river mouths or small inlets located at distances of 2½ miles, 3¼ miles, and 4 miles, respectively, from Bilaa Point.

4. Adjacent terrain and exits. The land adjacent to the shore along this beach is low except along the peninsula leading to Bilaa Point where the slopes rise to a central range of hills locally 455 feet high. The beach proper is backed by a fringe of coconut trees along its western and eastern portions, but in the center, for some distance east of the Bioburhan River, there is mangrove. The terrain generally is covered by dense jungle growth with mangrove areas extending inland along the streams.

Exit from the several portions of the beach is limited by the river mouths; inland exit is limited by the dense vegetation, although a fourth-class road lies from 1 to 2 miles inland along most of the beach. The only villages along this shore are Rizal and Araya, both of which lie between Bilaa Point and the Bioburhan River. The town of Surigao, eastward of the beach, has a radio station.

D. Surigao Area: Bilaa Point to Mount Tubay.

(PLAN 23; U.S.C. and G.S. charts 4603 and 4629)

(1) Offshore zone.

The 10-fathom line lies ⅛ to ⅜ mile offshore. Depths of 175 to 300 fathoms commonly occur within 1 mile of the coast. Beyond this zone the sea bottom drops off rapidly to depths of 700 to 800 fathoms 5 miles from shore.

The bottom sediments consist of a belt of sand ⅛ to 1⅞ miles wide adjoining the coast, with a few small coral reefs within the 10-fathom line. Beyond the sand belt the steeply sloping bottom is blanketed with mud and ooze.

(2) Coastal topography.

Between Bilaa Point and Mount Tubay, the coast is formed by the western slope of a high, rugged, heavily-timbered mountain range which reaches heights of 1,000 to 2,000 feet within a distance of ½ to 1½ miles inland. The coast is, in general, high, bold, clean, and steep-to. The mountain slopes terminate in steep, rocky cliffs, which, in some localities, are fronted by narrow strips of sand and gravel. In a few areas, as at Anaaon and Pili, the mountains are interrupted by small coastal flats. There is no road along this coast.

Bilaa Point, 9° 49′ 25″ N, 125° 26′ E, is composed of dark rock, is clean, and is fringed by a narrow, steep-to reef.

The villages of Ipil and Anaaon are situated on a small river flood-plain, having an area of 4 to 5 kilometers, which is covered by coconut trees and rice paddies. Three to four kilometers inland, timbered hills rise abruptly from the plain. Between Ipil and Anaaon is a sandy beach. Near the mouth of a small river which empties north of Anaaon, there are nipa swamps along the beach.

Madilao Point, about 4 miles southwestward from Bilaa Point, is 270 feet high, clean and steep-to, and composed of dark rock. It forms with Bilaa Point a deep unnamed bay which extends about 1 mile southeastward.

Pili is a small village situated on the south bank of the river of the same name. The river is flanked on either side by a narrow coastal plain, from which timbered hills rise abruptly east of Pili. Sandy beaches lie on both sides of the mouth of the river.

Mount Tubay, at the southern end of this section of the coast, is a prominent hill which rises to a height of 1,468 feet.

(3) Anchorages.

The bay between Bilaa and Madilao Points affords anchorage which is sheltered from northeast through east to southwest, but which is necessarily close-in because of the great depth of water.

From Madilao Point to Mount Tubay no anchorages exist along this coast.

(4) Dangers to navigation.

There are no off-lying dangers along this section of the coast.

(5) Landing beaches.

(a) Anaaon beach. (PLAN 23, Section A(a)) Reliability FAIR. The coast between Bilaa Point and Madilao Point is generally lined with a narrow, interrupted beach for a distance of about 4½ miles, but the best part of this beach extends for only about a mile north from Anaaon. The limits of this better part of the beach lie at 9° 47′ 30″ N, 125° 26′ 20″ E, and 9° 46′ 50″ N, 125° 25′ 25″ E. Landmarks include Bilaa Point, composed of dark rock, and Madilao Point, high, and also composed of dark rock. The approach to the beach is clear, and the bottom slopes within the 30-foot depth are moderate. There is no fringing coral reef along this shore; the bottom materials are mainly sand and mud.

This part of the coast is protected from the northeast monsoon, but is exposed to southwest winds, which are prevalent during the summer months. The flood tidal current moves southwestward along the shore. The mean tidal range is about 5 feet.

Information is scant regarding most of this beach, but the portion between Ipil and Anaaon is composed of firm sand with a slope of about 1 on 30. No structures occur on the beach, which is relatively narrow and is backed immediately by coconut groves. This is true also of the remainder of the beach as far south as Madilao Point, although there are several interruptions by nipa swamps. North of Ipil the vegetation is largely jungle. A road connects the villages of Ipil and Anaaon and can be reached conveniently from the beach. This road offers a connection about 3 miles south with a road to Surigao.

(*b*) *Malimono beach.* (PLAN 23, Section A(b)) A short, stony beach, about 300 feet long, lies at the village of Malimono, about 18 miles south of Bilaa Point. The village lies at 9° 35′ N, 125° 25′ E. It has no good landmarks. The offshore approach is clear, and the bottom slopes within the 30-foot depth are steep. The shore is protected from the northeast monsoon, but is exposed to southwest winds and waves, which are prevalent during the summer months. The flood tidal current moves southward along the shore, and the mean tidal range is about 5 feet. The beach is narrow and has a steep slope. It is composed predominantly of pebbles and is generally firm. The village lies at the mouth of a stream which descends steep jungle slopes inland. No trails are known in this vicinity.

E. Cagayan Area.

Gorda Point to Sulauan Point (Macajalar Bay). (PLAN 23; U.S.C. and G.S. charts 4604 and 4639)

(1) Offshore zone.

The 10-fathom line lies ½ mile to less than ⅛ mile offshore. Beyond this curve the bottom slopes steeply seaward, reaching depths of 455 to 540 fathoms in the outer central part of the bay.

Except for a narrow, irregular belt of sand bordering the shore, the bottom sediments consist of mud with local patches of sand. Areas of rocky bottom occur south and west of Alutaya reef.

(2) Coastal topography.

Macajalar Bay is 16 miles wide at the entrance between Gorda and Sulauan Points, and extends about 12 miles southeastward. The eastern shore is the higher and is bordered by numerous sandy beaches which are separated by low rocky points (FIGURE IV - 69). The head of the bay consists of a very narrow, flat, well-drained coastal plain, fringed by narrow coral reefs. Except for coconut groves along the beaches, the plain is nearly treeless. About 1 mile inland grass-covered hills rise to heights of 1,500 feet (FIGURES IV - 70 and IV - 71). The western shore of the bay is low and bordered by steep-to coral reefs.

Gorda Point, 8° 42′ N, 124° 45′ E, is clear and steep-to. It is precipitous and wooded, has a flat crown, and forms a very prominent landmark from any part of Macajalar Bay.

The village of Jassan, at the head of Cabulig Bay, contains a very conspicuous church.

Tagoloan is a small town situated 1½ miles up the Tagoloan River, which discharges 5½ miles south of Cabulig Bay. There is very little water on the bar at the mouth of the river. The river has a sandy bottom and is normally 100 to 300 feet wide at its mouth, but attains a width of 500 feet when in flood, following cloudbursts in the mountains.

All the rivers between Bugo and Cagayan are shallow and have gravelly beds traversable in the dry season. A steep spur 500 to 800 feet high, extending coastward from the grass-covered mountains in the interior, lies ⅛ mile from the shore between the villages of Kugman and Gusa.

Macabalan Point, about ¾ mile southeastward from the mouth of the Cagayan River, is low and sandy and is marked by a few native houses and coconut trees. It is steep-to on its eastern side, but on the northern side shoal water extends to a distance of nearly ½ mile.

Cagayan Light, 8° 30′ 20″ N, 124° 39′ 43″ E, is a white steel-framed structure rising 58 feet above high water on the north side of Macabalan point.

The Cagayan River (U.S.C. and G.S. chart 4604), which discharges into the head of Macajalar Bay, has 1½ fathoms of water on its bar at low water. The depth and direction of the channel across the bar changes constantly with the rainy season. Shoal water extends about ⅜ mile from the river's mouth.

FIGURE IV - 69. *Cagayan area, Macajalar Bay, Bugo.*
S coast of bay, looking northward.

FIGURE IV - 70. *Cagayan area, Macajalar Bay.*
Del Monte landing field (Libona), looking northward. 1938.

FIGURE IV - 71. *Cagayan area, Macajalar Bay.*
Mountains SE of Macajalar Bay, looking SE from offshore near Bugo.

The west bank between the mouth and the town of Cagayan attains heights of 40 to 50 feet above river level. The east bank is much lower, ranging from 4 to 10 feet in height.

Cagayan, the capital of Misamis Oriental province, is situated on the Cagayan River about 2 miles from its mouth and about 1¾ miles southwestward from Macabalan Point. The coastal plain here has a width of about 3 miles.

Between the village of Despujols and Sulauan Point the hills, 1 to 2 miles behind the coast, are locally forested.

Sulauan Point, the western entrance point to Macajalar Bay, is low and wooded. Its shore line consists of low coral reefs alternating with sandy beaches. It is entirely fringed by a coral reef, part of which bares at low water, and which attains a maximum width of almost ½ mile off the north side of the point.

(3) Anchorages.

Cabulig Bay, about 4 miles southward from Gorda Point, offers anchorage sheltered during the northeast monsoon, but necessarily very close-in because of the great depth of water.

At Tagoloan, there is very little water on the bar at the mouth of the river, and the water outside of the bar is too deep to afford anchorage.

For anchorages off Cagayan, see Chapter VI.

At Opol there is a break in the fringing reef where small trading steamers or large launches can anchor in 4 fathoms, mud bottom.

(4) Dangers to navigation.

The middle of Macajalar Bay is deep and clear, and contains no detached dangers, with the exception of Alutaya Reef.

Alutaya Reef, situated 3½ miles 240° true from Gorda Point, is of oval form and has a greatest diameter of ⅔ mile. At low water the center uncovers, leaving bare a bank of sand and rocks. The channel between it and the shore is about 2½ miles wide and over 100 fathoms deep. A coral reef, partly bare at low water, extends ¾ mile northward from Malugan Point. Between this point and Sulauan Point there are 5 small, detached reefs, none of which are ½ mile from shore.

(5) Landing beaches.

(*a*) *Villanueva beaches.* (PLAN 23, Section B(a); FIGURE IV - 72) Reliability GOOD. Several beaches, separated by rocky points, occur between Bubuntugan and Tagoloan River, over a distance of about 8 miles along the east shore of Macajalar Bay. The beaches themselves have a total length of about 5 miles, but a narrow strand of varying width occurs between some of them. The outside limits of the northernmost and southernmost beaches lie at 8° 40′ N, 124° 44′ E, and 8° 34′ N, 124° 44′ E. The most prominent landmark is Gorda Point at the northern limit of the beach. It is steep and wooded, with a flat crown. A conspicuous church may also be seen in the village of Jasaan. The offshore approaches to the beaches are clear except for Alutaya Reef, 3½ miles southwest of Gorda Point. Nearshore the bottom slopes are moderate to steep. Information regarding fringing coral reefs is scant, but reefs are known to exist between Bubuntugan and Jasaan, north of Villanueva,

and in short stretches between Villanueva and the Tagoloan River. The bottom materials are mainly sand and mud.

The area is sheltered from the northeast monsoon, but choppy seas may be experienced during the southwest monsoon. The mean tidal range is about 3 feet, and the flood tidal current moves southward along the eastern bay shore.

The several beaches are composed of coarse sand (FIGURE IV - 72), fairly firm, but soft portions may be encountered locally, especially near the mouths of the several rivers which flow across the area. Muddy portions may be encountered near the larger streams. The slope of the beach is fairly uniform, ranging from 1 on 25 along the northernmost beaches to about 1 on 12 near the Tagoloan River mouth at the southern limit of the beaches. No structures are known along these beaches. Shore drift is variable, but predominantly southward. Surf is generally light.

FIGURE IV - 72. *Cagayan area, E shore Macajalar Bay.*
Beach of coarse sand N of Tagoloan River, looking northward.

The terrain inland of the beaches is low along a narrow coastal belt, but rises inland. The lowland plain extends inland along the rivers, and is generally cultivated in coconut groves, but the steeper slopes are more densely vegetated. Exit from the several beaches is provided by a first-class paved road which closely parallels the shore and connects the villages of Bubuntugan, Jasaan, Solana, Aplaya, Villanueva, and Tagoloan, all of which lie behind or adjacent to the beach area. This road is part of the main coastal highway which connects with Gingoog Bay on the northeast and Iligan Bay on the southwest.

(*b*) *Cagayan beaches.* (PLAN 23, Section B(b); FIGURES IV - 73 to IV - 76) Reliability GOOD.

1. Location and extent. From the mouth of the Tagoloan River generally southwestward around the head of Macajalar Bay to the Cagayan River, a distance of about 11 miles, the shore is lined with a nearly continuous sand beach which extends a short distance westward of the Cagayan River itself. The beach varies considerably in width, attaining a maximum of about 150 feet. The limits of the beach area lie between 8° 34′ N, 124° 44′ E, and 8° 30′ N, 124° 39′ E. Landmarks for this stretch of coast include the mouth of the Tagoloan River at the northeastern limit of the area, the buildings and water tower at Bugo (FIGURE IV - 73), the wharves at the port of Cagayan, and Macabalan Point, low and sandy, with a light on a steel-frame structure 58 feet high.

2. Nearshore. The approach to this beach area is clear to the 30-foot depth, but the bottom slopes within that depth are steep to moderate. A fringing coral reef lines much of the shore in front of the beach, although the reef is absent at the mouths of the larger rivers, notably the Tagoloan and Cagayan Rivers, which have shifting bars across their mouths. A broad sand bar which bares at low water extends eastward from the

FIGURE IV - 73. *Cagayan area, E shore Macajalar Bay.*
Beach and pier at Bugo, looking eastward. Sept. 1936.

Cagayan River mouth. Between Agusan and Gusa (FIGURE IV - 74) the fringing reef varies in width from 100 to 300 feet, and is generally narrow along its entire extent. Bottom materials consist mainly of sand and mud, largely of coral origin, except near the river mouths.

The northeastern part of the beach area is relatively sheltered from the northeast monsoon, but is exposed to winds and waves from the west and southwest. The area near Cagayan, on the other hand, is sheltered from the southwest monsoon, but open to the northeast. The mean range of the tide is about 3 feet, and the flood tidal current moves westward along the head of the bay.

3. Character of beach. The beach along this area consists mainly of sand, locally becoming muddy where shore drift from the river mouths is carried along it. The sand is mainly of coral composition along those parts of the beach which are fronted by the fringing reef (FIGURE IV - 74), although mixtures of coral and non-coral material are common. The beach is widest in the vicinity of Bugo, where it attains a maximum width of 150 feet between low and high tide. Several rivers interrupt the beach, mainly along its central portion, where the Umalag, Kugman, and Bigaan Rivers flow across it. The Cagayan River interrupts the beach near its western limit. The beach slope is about 1 on 20 a short distance south of the Tagoloan River, and remains moderately steep along its eastern portion, becoming increasingly flatter near its western limit, although local steeper portions occur along the narrower parts of the beach. The beach varies in firmness; it is hard and firm between the Tagoloan River and Bugo, but becomes soft in the vicinity of Agusan and again westward of Gusa, where its composition is muddy. Shore drift along the beach is variable, but material is carried southward from the Tagoloan River and both eastward and westward from the Cagayan River. Surf varies in intensity along the shore, with perhaps the most exposed portion in the central part of the beach. It is reported that the surf at Bugo is seldom heavy. A number of structures have been built along the beach, notably the large wharf at Bugo (FIGURE IV - 73) and the Cagayan wharves just south of Macabalan Point (FIGURE IV - 75).

4. Adjacent terrain and exits. The shore inland of the beach area is generally low, with a coastal plain of variable width leading to the hilly country of the interior. Locally, as in the vicinity of Cagayan, the coastal plain is at least 2 miles wide and is backed by terraces rising above the river plain (FIGURE IV - 76). The main first-class coastal highway runs close inland of the shore and connects the settlements of Tagoloan, Bugo, Agusan, Kugman, and Gusa with the more inland town of Cagayan. From Cagayan the road runs westward toward Sulauan Point. A highway junction is at Agusan where an inland first-class road leads generally southeastward. A second-class road also leads southward from Cagayan, ultimately connecting with a number of inland trails. An excellent road connects Cagayan with the wharves near Macabalan Point.

FIGURE IV - 74. *Cagayan area. S shore Macajalar Bay.* Beach on SE shore of bay, near Gusa, looking northwestward.

The vegetation along much of the shore is coconut palms, although locally some mangrove occurs. Farther inland the terrain is mainly covered with jungle. Exit from the beach area to the coastal highway is almost everywhere possible by vehicles which may pass among the coconut palms.

The town of Cagayan has a radio station. No fresh water is available for ships; the local supply is probably wells.

(*c*) *Opol beaches.* (PLAN 23, Section B(c)) Reliability FAIR. The stretch of coast from about a mile westward of the mouth of the Cagayan River northwestward to Sulauan Point is generally lined with an interrupted sandy beach, which is best developed at the villages of Opol, Molugan, and El Salvador. The remainder of the coast is generally unsuitable for landings but probably has a number of locally usable beaches. The absence of specific information on the distribution of the beaches renders it impossible to give exact coordinates, but the area lies between 8° 30′ N, 124° 39′ E, and 8° 40′ N, 124° 29′ E. Sulauan Point is low and wooded and serves as a landmark for the northwestern limit of the area.

The approach to the 30-foot depth is clear, but the inshore bottom slope is steep and nearly the entire area is fronted by a fringing coral reef of variable width, as much as ½ mile at Sulauan Point. Some passages occur through the reef, notably at the village of Opol. Bottom materials are mainly coral sand and mud. The stretch of coast is relatively protected from the southwest monsoon, but is open to winds and waves from the northeast and north. The mean tidal range is about 3 feet and the flood tidal current moves northwestward along the shore.

The beaches are composed of coral sand and debris and where best developed, as at the several villages, they are firm, and have slopes on the order of 1 on 10. Along parts of the coast, the beaches are interrupted by rocky headlands so that communication lengthwise is not always possible. No wharves or other structures are known. Shore drift is variable. Several rivers interrupt the beaches.

This part of the coast fronts a narrow coastal plain, but a short distance inland the country rises to higher ground. Coconut groves are common along the shore but are interspersed with areas of native vegetation; the interior is generally dense jungle. The first-class coastal highway from Cagayan swings directly to the shore at Opol and connects that village with Molugan, El Salvador, and Alubihid, whence the road cuts inland around Sulauan Point and continues along the coast toward Iligan Bay. This road is generally directly accessible from the beach.

F. Misamis Area: Sulauan Point to Iligan.

(PLANS 23 and 24; U.S.C. and G.S. charts 4604 and 4639)

(1) Offshore zone.

The 10-fathom line lies ⅛ to ¼ mile offshore, except on the north side of Sulauan Point, where it attains a maximum distance of ½ mile. From this line the bottom shelves very rapidly to depths ranging from 330 to about 750 fathoms 5 miles offshore.

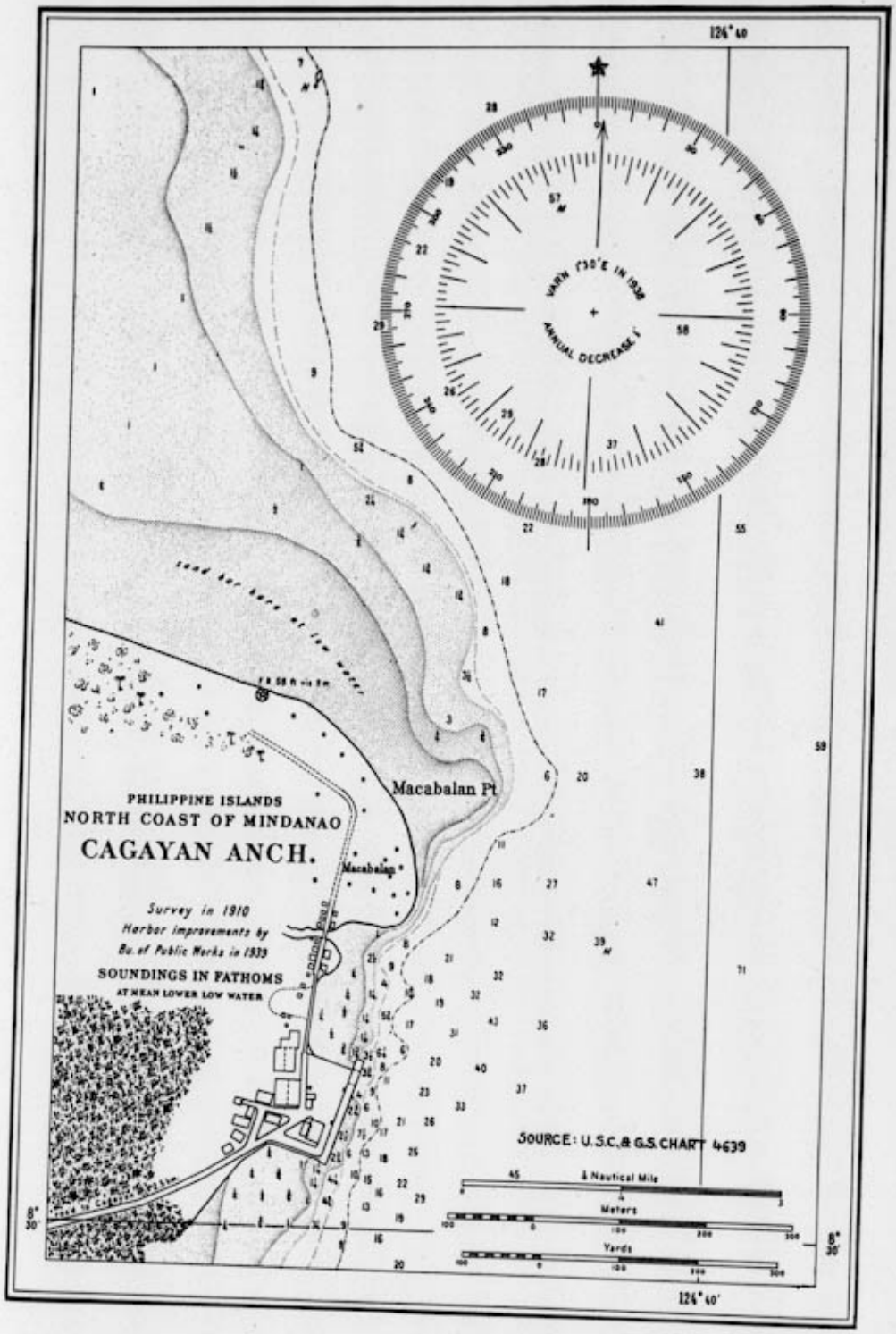

FIGURE IV - 75. *Cagayan area, Cagayan Anchorage.* Hydrographic chart, from U.S.C. and G.S. chart 4639.

The bottom sediments consist of a band of sand and coral debris ¼ to 1¼ miles wide bordering the coast. Off the river mouths this band is interrupted by local deposits of intermixed mud, silt, and sand. This zone is succeeded offshore in deeper water by muds, with a patch of hard coral in 295 fathoms 3 miles northward of Sulauan Point.

(2) Coastal topography.

Sulauan Point to Iligan. From Sulauan Point the coast trends southwestward for 11 miles to Initao Point, which is timbered and much undercut by wave action and thence south-southwestward for about 20 miles to the town of Iligan at the head of Iligan Bay. This section of the coast is fringed by a narrow steep-to coral reef with very deep water at its edge. The coastal plain along the east shore of Iligan Bay is narrow, and is backed by heavily-wooded hills as far south as Naauan.

Iligan Bay, between Initao Point eastward and Polo Point westward, is a great arm of the sea about 33 miles wide and 23 miles long. Its eastern and southern shores are, in general, safe and steep-to.

Initao Bay is a slight indentation, less than ½ mile wide, in the coast line between Initao and Maputi Points. The village of Initao, almost entirely hidden by coconut trees, lies at the head of the bay on the south side of the Initao River. The mouth of the Initao River is surrounded by low, swampy and muddy ground.

Maputi Point, about 4 miles southward from Initao Point, is broad and rugged.

Naauan Head can be distinguished by its low cliff face. At Naauan there is a sandy beach over 1 mile long, immediately back of which runs the coastal highway. At a distance of about 1 mile from shore a more or less broken row of hills extends southward to the Mandulog River. These hills are covered with grass and brush most of which does not exceed 3 to 4 feet in height.

A beach flanked by numerous coconut trees occurs at Manticao near the mouth of a small river flat. Hills begin to rise some distance back of the beach.

At Kiwalan there is a small beach 75 to 100 feet long, at the head of the cove near the sawmill.

Quinalang Cove (U.S.C. and G.S. chart 4639) is a small indentation in the coastline 3 miles northward from the town of Iligan.

The Mandulog River discharges eastward of Quinalang Point, the southern point of Quinalang Cove. The river is about 200 feet wide and has numerous sand bars at its shallow mouth.

FIGURE IV - 76. *Cagayan area, Cagayan River and town.*
Looking S over town past highway bridge across Cagayan River to low terraces in right background.

Between the Mandulog River and Iligan, a long, sandy flat is exposed at low tide.

The town of Iligan lies in the southeast angle of the bay on the north bank of the Iligan River. The river is small and unimportant, and has less than 3 feet of water on its bar at low water. It is subject to sudden rises from cloudbursts in the interior. The coastal highway, surfaced with crushed coralline limestone, runs close to the beach at Iligan. The level coastal plain here extends inland about 2 miles to the foothills.

Iligan Light, 8° 13′ 56″ N, 124° 13′ 54″ E, was exhibited 37 feet above mean high water from a white, cylindrical steel tower at the shore end of Iligan pier.

(3) Anchorages.

There is an anchorage for small vessels in 3 fathoms of water in front of the village of Initao in Initao Bay.

Anchorage sheltered from the northeast monsoon may be found in 20 to 25 fathoms about ⅛ mile from the edge of the shore reef in Quinalang Cove.

For anchorages off Iligan, see Chapter VI.

(4) Dangers to navigation.

No detached dangers to navigation exist off this section of the coast.

(5) Landing beaches.

(a) Initao beach. (PLAN 23, Section C(a)) Reliability FAIR. A short sand beach lies at the village of Initao along the eastern shore of Iligan Bay at 8° 30′ N, 124° 18′ 10″ E. The area lies between Initao Point and Maputi Point, which is broad

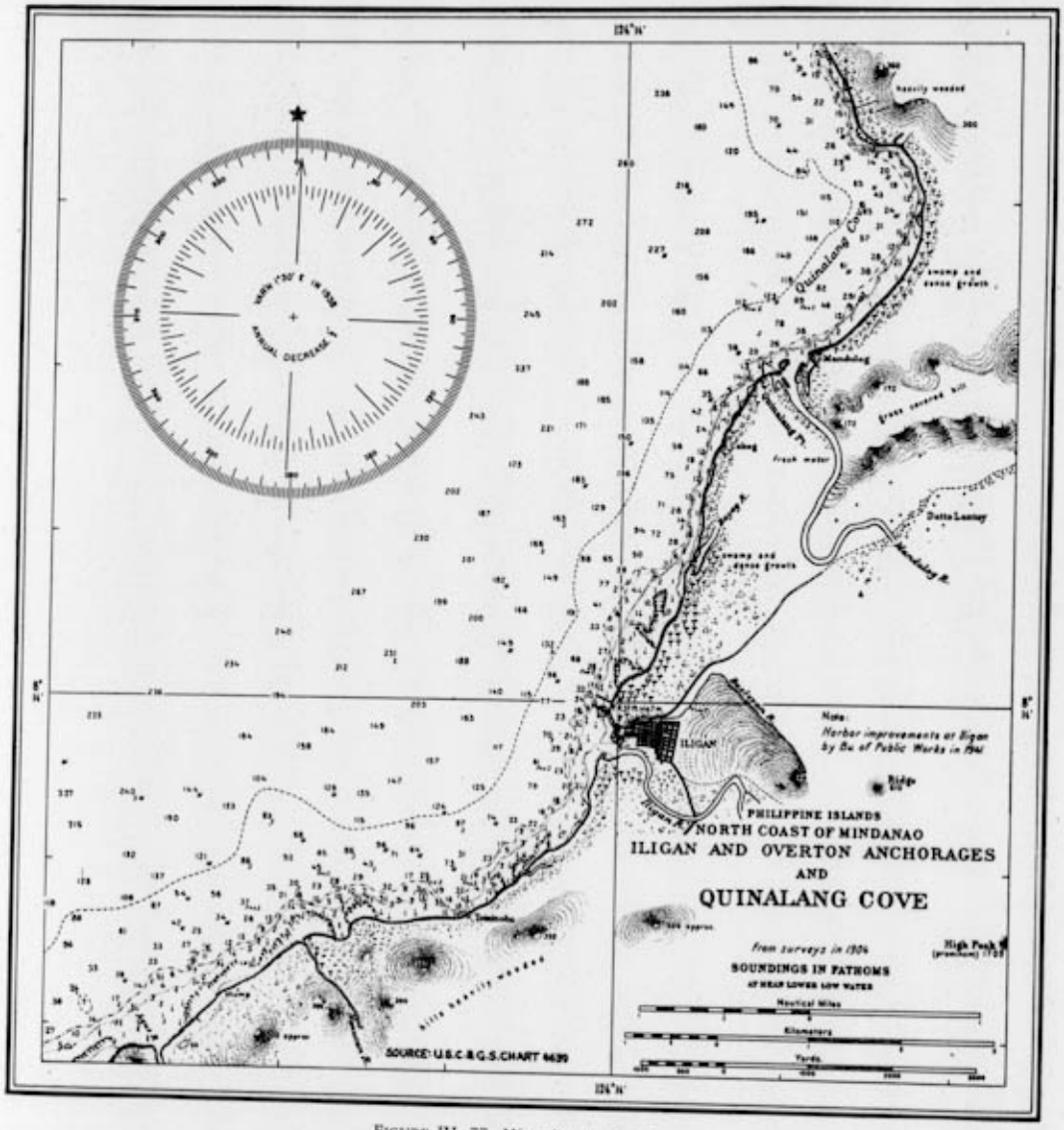

FIGURE IV - 77. *Misamis area, Iligan.*
Hydrographic chart of Iligan and Overton Anchorages and Quinalang Cove.

FIGURE IV - 78. *Misamis area, Iligan.*
Iligan village and adjoining coast, SE shore of Iligan Bay, looking northwestward.

and rugged. The offshore approach is clear, and the bottom within the 30-foot depth rises steeply to a fringing coral reef which lies on both sides of the village. The bottom materials are mainly coral sand and mud.

The beach is protected from the northeast monsoons, but is exposed to winds and waves from northwest through southwest. The mean tidal range is about 3 feet, and the flood tidal current moves southward along the shore. The beach is composed of coral sand, is firm, and has a slope of about 1 on 10. The fringing reef, which fronts at least part of the beach, is about 200 feet wide at low tide.

No structures are known along the beach, but direct access is afforded to Initao village which is almost hidden by coconut palms. The first-class coastal highway runs through the village and continues southward along the eastern shore of the bay. It is generally accessible from the shore. The coastal plain behind the beach is narrow and is backed by wooded hills rising to over 1,000 feet about 5 miles inland. A transmission line generally parallels the coast southward from Initao Point about a mile inland. Southward of Initao as far as Salimbal Point, a distance of 10 miles, the shore has scattered beaches, but the quality of the beaches in terms of landing operations is not known. Landings can undoubtedly be made along this stretch of coast, however, and the coastal highway is readily accessible.

(*b*) *Iligan beaches.* (PLAN 23, Section C(b); FIGURES IV - 77 to IV - 81) Reliability GOOD.

1. Location and extent. From Salimbal Point to the mouth of the Agus River, a distance of about 10 miles, the shore is lined with a discontinuous sand beach, which is most developed in the vicinity of Iligan (FIGURES IV - 77 and IV - 78), where some harbor structures are present. The northernmost limit of the beach at Salimbal Point lies at 8° 19′ 50″ N, 124° 14′ 45″ E, and the southwestern limit at the Agus River lies at 8° 12′ 00″ N, 124° 11′ 10″ E. Among landmarks for the area are the concrete pier at the mouth of the river, at Iligan, and a light on a steel tower, 37 feet high, at the end of the pier.

2. Nearshore. The approach to this stretch of coast is clear to the 30-foot depth. Near the shore the bottom slope is relatively steep to the coral reefs that fringe much of the shore. Information is incomplete regarding the exact distribution of the fringing reefs, but they are known to occur on both sides of Iligan and along the shore nearly as far as the Agus River mouth. The bottom materials are mainly fine sand and mud, largely of coral origin. This part of the bay is relatively sheltered from the northeast monsoon, but is exposed to winds and waves from the northwest through west. The north-

ern part of the area near Salimbal Point is subject to winds from the southwest also. The mean tidal range is about 3 feet and the flood tidal current moves south and southwestward along the bay shores.

3. Character of beach. The beach is composed mainly of coral sand, locally mixed with non-coral material in the vicinity of the several streams which cross it; namely, the Mandulog, Iligan, Nonucan, and Agus Rivers. Between the Mandulog and Iligan Rivers is a swampy area with a small inlet cutting across the beach. The beach is also interrupted by the 2 harbor structures and a short sea wall at Iligan (FIGURE IV - 79). The width of the beach varies to a maximum of about 75 feet at low tide, but its average is probably less than 50 feet. The wider portions occur along the less exposed parts of the coast and near the river mouths. The beach is generally firm (FIGURE IV - 80) and is especially suitable for landings at the villages of Mandulog and Tominobo, and in a small cove at old Camp Overton, a short distance east of the Nonucan River. Softer portions of the beach occur locally especially in the stretch between the Mandulog River and the reefs north of Iligan. The beach slope varies from about 1 on 10 along the narrow portions at the edge of the fringing reefs to considerably flatter portions near the mouths of the larger streams. Two piers are shown on charts of Iligan (FIGURE IV - 77) dated 1941; aerial photographs made prior to 1941 (FIGURE IV - 78) show only one. The remains of an old pier are also found at the site of Camp Overton (FIGURE IV - 81), and fish traps may be present at scattered intervals over the fringing reefs. Surf along the beach is generally light in Quinalang Cove and near Iligan, but may be more pronounced from Tominobo to the Agus River. Shore drift is generally southward and westward.

4. Adjacent terrain and exits. This stretch of coast is backed by a plain of variable width which rises to a series of hills inland. The first-class coastal highway roughly parallels the shore and direct access to it is available at several places through the groves of coconuts which line much of the shore belt. In some places, however, exit to the road is through thick undergrowth as in the swampy area north of Iligan. The position of the road with respect to the shore is shown in FIGURES IV - 78 and IV - 81. A road and several trails lead inland from Iligan,

FIGURE IV - 79. *Misamis area, Iligan.*
Seawall and other structures at Iligan, looking southward.

FIGURE IV - 80. *Misamis area, E shore Iligan Bay.*
Beach near Tuminobo village SW of Iligan, looking northwestward.

and a main highway runs inland from Camp Overton, leading ultimately to the southern coast of Mindanao. A transmission line parallels the main coastal highway as well as the road inland from Camp Overton. Along the river valleys and locally on the coastal plain are some cultivated fields, but the bulk of the inland area is covered with jungle. Fresh water is available at Iligan.

G. Misamis Area: Iligan to Misamis.

(PLANS 23 and 24; U.S.C. and G.S. charts 4604, 4639, and 4640)

FIGURE IV - 81. *Misamis area, SE shore Iligan Bay.*
Coast at Camp Overton, showing old pier and fish trap. Looking SW. 2 May 1935.

(1) Offshore zone.

The 10-fathom line lies ⅛ to ⅝ mile offshore, except in the inner part of Port Misamis, which is entirely within the line. Depths of nearly 500 fathoms occur within 5 miles of the coast.

Except in Port Misamis, the bottom sediments are composed predominantly of sand with coral debris and coral patches within the 10-fathom curve, and of mud beyond it. Off river mouths the near-shore sand belt is interrupted by delta deposits of mud, silt, and sand.

In Port Misamis the area within the 10-fathom line consists of sand and coralline debris next to the shore, and of mud with numerous sandy shoals and coral reefs offshore.

(2) Coasts.

Camp Overton is an abandoned military post about 2 miles southwestward from Iligan. A few broken piles mark the sites of former wharves here and at the village of Tominobo (FIGURE IV - 81). Thickly-forested hills, up to 1,500 feet in height, rise ¼ to ½ mile behind the shore line.

From Camp Overton the coast trends westerly, for about 11 miles to Binuni Point, and is intersected by many small rivers. Steep, rough, heavily wooded hills rise a short distance inland along this stretch of coast.

From the Agus River to the Laparan (Ridapon) River, about 4 miles westward, there is very little fringing reef. The mouth of the Laparan is blocked by a shallow sand bar. Near the Laparan River the coral begins again and continues to Binuni Point with a general width of nearly ½ mile.

Between the Laparan and Dalicanan Rivers the coast is bordered by a coconut-fringed beach of variable slope, which in places rises 5 feet above low tide.

About 1 mile east of the village of Causwagan a good sandy beach occurs in an inlet 1,200 to 1,500 feet long.

Binuni Point is low and wooded and surrounded by a fringing coral reef for a distance of about ¼ mile. From here the coast trends southward and westward toward Port Misamis.

The mouth of the Liangan River is about 100 feet wide and 6 to 10 feet deep behind the bar, with the deepest water on the east side. The west side of the river is shallow and bordered by a bank 5 to 6 feet high. The Liangan is subject to severe floods following storms in the mountains of the interior.

A narrow fringing reef, fronted by broad sand bars, extends from the Liangan River to the town of Kolambugan. This section of the coast is low, muddy, and locally rocky.

The Maigo River, which empties into Port Misamis at Fort Almonte, 2¼ miles west of Binuni Point, is very shallow, and is not navigable even for barges.

Port Misamis (FIGURE IV - 82), including Panguil Bay, is a long, narrow inlet extending southwesterly for about 22 miles. It is 9 miles wide at the entrance between Binuni and Loculan Points, but narrows to a width of less than 1 mile at a distance of about 12 miles from the entrance. From this point it spreads out into a large shoal basin known as Panguil Bay, which is navigable only by small launches. Tangub is the only settlement of any size on Panguil Bay.

The shores of Port Misamis between Binuni Point and the town of Misamis are low and mangrove-covered except for an area of high hills behind Palalagoya Point on the south shore of the port, directly south of Misamis. North of Misamis is an extensive sandy shore.

Two channels, a northern entrance and an eastern entrance, lead into Port Misamis. The eastern channel is the wider and better, and the one most generally used.

The town of Misamis lies on the north shore of the port, 1¾ miles southwestward from Opol Point. The very prominent fort is about ¼ mile southeastward from the town, on Misamis Point. There is also a conspicuous water tank at the lumber mill 450 feet northwest of the fort. Bucagan Hill, about 1½ miles west of Misamis Harbor, overlooks Port Misamis and is covered with coconut trees.

Port Misamis Light, 8° 08′ 28″ N, 123° 50′ 45″ E, was displayed from a concrete beacon on the southwest bastion of the fort.

(3) Anchorages.

For anchorages in Kolambugan Bay, see Chapter VI.

(4) Dangers to navigation.

A number of reefs and shoals render the approach to Port Misamis somewhat dangerous and the entrance should be cautiously approached.

The outer danger on the south side of the eastern approach to Port Misamis is Narvaez Shoal, a small patch of coral, covered by a least depth of 1¾ fathoms, lying 1½ miles from the southeast shore of the port.

Kulasihan Shoals, with 1½ fathoms least water over them, lie southward from Narvaez Shoal and about ¾ mile from shore.

Panguilinan Shoals are 2 small patches, covered by 1¾ fathoms least water, lying about 1½ miles southwestward from Narvaez Shoal.

Pasil Shoal is a long, narrow shoal extending nearly 3 miles in a northeast direction from Palalagoya Point on the southern side of the port. It has depths varying from ¼ to 3 fathoms.

Shoal water extends nearly 1 mile eastward and northeastward from the fort at Misamis. One-quarter mile beyond there is a shoal spot under 2½ to 3 fathoms of water.

(5) Landing beaches.

(a) Buru-un beaches. (PLAN 23, Section C(c)) Reliability FAIR. A sand beach of limited extent lies between the Agus River and Buru-un, a distance of about a mile. The center of the beach lies at 8° 12′ N, 124° 11′ E. In addition there are scattered beaches at intervals along the coast as far west as Binuni Point, a distance of about 12 miles. The coast is generally low and wooded, and there are no conspicuous landmarks.

The offshore approach is clear to the 30-foot depth; within that depth the bottom slopes are moderate to steep to a coral reef that fringes the shore along most of the distance between the Agus River and Binuni Point. In the western half of the general area this reef attains a width of about ½ mile. The bottom materials are predominantly coral sand and mud. The area is exposed to winds from the northeastern and northern quadrant. The mean tidal range is about 3 feet and the flood tidal current moves westward along the shore.

The beach at Buru-un is composed of sand and is moderately firm. It has a slope of about 1 on 10. The other beaches to the west of this village cannot be located accurately, but in all likelihood they occur at intervals along the inner edge of the fringing reef and in the vicinity of the several stream mouths which are generally marked by interruptions in the reef. No structures are known along any of these beaches. Surf may be relatively heavy when waves approach from the northern quadrant.

The main first-class highway runs close inshore along this entire area, passing through the village of Buru-un. It is directly accessible from the beach between the Agus River and the village, but no information is available regarding its accessibility from the beaches farther west. The coastal fringe is cultivated in coconut groves, but the interior hills are densely wooded.

(b) Kolambugan beach. (PLAN 24, Section C(d)) (FIGURE IV - 83) Reliability FAIR. A small sand beach is located just east of a lumber-mill wharf in the vicinity of Kolambugan village, but it is not precisely known whether the beach lies opposite the village itself or closer to Migcaniguing Point. From the best evidence available, this beach is shown on the accompanying map as being closer to the point than to the village; the beach lies at about 8° 06′ 40″ N, 123° 53′ E. No conspicuous landmarks lie along this shore, but a light was shown from the pier.

The approach to the beach is hindered by Narvaez, Kulasihan and Panguilinan Shoals, which lie northeastward of it, all within a radius of about 5 miles from the beach. Nearshore the bottom shoals rapidly within the 30-foot depth, and the shore itself is lined with a nearly continuous fringing coral reef. Bottom materials are mainly mud, partly of coral origin. The beach is relatively sheltered from winds and waves although it is open to the north. The mean tidal range is about 3 feet and the flood tidal current moves generally southwestward.

The beach is composed of coral sand and debris. It is narrow and has a slope of about 1 on 10. A wooden pier built by a lumber company projects 1,000 feet outward from the shore at the western end of the beach. The water depth at the end of the pier is 25 feet. The surf along the beach occurs in a relatively broad belt when waves are running.

The shore immediately behind the beach is lined with the buildings of the lumber camp (FIGURE IV - 83), and a trail parallels the shore northeastward to the terminus of the main coastal highway at Kolambugan. Fifteen miles of logging railroad run northeastward from the area and then inland along the valley of the Liangan River. A trail or road also runs south-

FIGURE IV - 82. *Misamis area, Port Misamis.*
Looking SW in Port Misamis, at SW end of Iligan Bay. Prior to April 1935.

FIGURE IV - 83. *Misamis area, Port Misamis.*
Beach near lumber mill at Kolambugan village on SE shore of Port Misamis, looking southeastward.

westward roughly paralleling the coast around Panguil Bay. The shores adjacent to the beach are lined with a thick mangrove swamp, and inland the terrain rises to thickly-wooded hills.

(*c*) *Misamis beach.* (PLAN 24, Section C(e); FIGURE IV - 84) Reliability FAIR.

1. Location and extent. Beginning at the town of Misamis and extending for about 6 miles northward along the western shore of Iligan Bay to Loculan Point is an interrupted sand beach of variable width. The limits of the beach lie at 8° 08′ 40″ N, 123° 50′ 30″ E, and 8° 12′ 20″ N, 123° 51′ 50″ E. Landmarks for Misamis include a prominent water tank, an old fort southeast of town, and a light that was shown from a concrete beacon on the fort. The shore northward, to and including Loculan Point, is low and sandy.

2. Nearshore. The approach to this beach is obstructed by the Loculan Shoals which lie between Misamis and Loculan Point, and by a shoal area extending northeastward from Misamis toward Opol Point (FIGURE IV - 84). Within the 30-foot depth the bottom slope varies from gentle to moderate, with the steepest slopes opposite Opol Point. No fringing reef occurs along this beach, but the Loculan shoals are coral and a reef begins northward of Loculan Point. Along the landward edge of this reef, may be scattered sand beaches. The bottom materials are mainly fine sand and mud, locally of coral origin. The northern part of the beach is exposed to winds and waves from the northeast and east, but the southern half of the beach is relatively sheltered. The mean tidal range is about 3 feet and the flood tidal current moves southwestward into Panguil Bay.

3. Character of beach. The beach is composed of sand and mixed coral debris and is interrupted at half a dozen points by stream mouths or inlets. Some of these stream mouths parallel the shore, giving the appearance of long sand spits. Locally the beach is interrupted by short stretches of mangrove and is fronted by tidal flats, especially just southwest of Opol Point. The beach varies in width, being widest in the vicinity of Misamis, near Opol Point, and at Loculan Point. The slope of the beach is about 1 on 20 at Misamis Point, but it is very flat over most of its extent, especially in the vicinity of the several river mouths. The firmest parts of the beach are at Misamis Point and Loculan Point, but some soft areas are encountered in the more sheltered portions and at the river mouths. The only structures along this entire beach are 2 piers located 900 feet and 1,800 feet, northwest of Misamis Point with depths of 20 feet and 14 feet, respectively, at their ends.

4. Adjacent terrain and exits. The terrain inland of this beach is a coastal plain, generally low and locally swampy. Coconut groves occur behind the beach in the vicinity of Misamis, but elsewhere the beach is backed by dense natural vegetation including localized areas of mangrove along the streams and inlets. Rice fields are found west of Misamis and south of Clarin. The main coastal highway from Misamis northward along the west shore of Iligan Bay is close behind the beach for about a mile northeast of Misamis, but thereafter it departs from the shore nearly a mile until the town of Clarin is reached. A good road extends from Misamis to the fort and piers on Misamis Point. A radio station is located in the town. Artesian water is available.

H. Misamis Area: Misamis to Polo Point.

(PLAN 24; FIGURES IV - 85 and IV - 86; U.S.C. and G.S. charts 4604, 4639, and 4640)

(1) Offshore zone.

The 10-fathom line lies ⅜ to 1⅜ miles offshore. Within the 100-fathom line the bottom sediments consist predominantly of sand and coral debris studded with numerous coral reefs, except in Port Misamis where muds blanket most of the sea floor. Beyond the 100-fathom curve the bottom consists of mud with numerous sand and coral patches.

(2) Coastal topography.

As far north as Balaring Point there is a network of detached reefs, shoals and sand bars offshore. The coast is generally fringed with coral which in some places extends seaward for 1½ miles. The short line consists of low-lying alluvial mud flats alternating with sandy beaches. The coastal plain is low, narrow, flat to gently rolling, and swampy. It is covered with coconut groves, interspersed with some impassable bogs and with mangrove swamps along the shore line. At a distance of 1 to 2 miles inland the foothills begin to rise gradually to the mountain range that parallels the shore.

The foothill belt is 6 to 10 miles wide and is about half cultivated and half forested with large trees. The mountains proper are heavily wooded and much broken, with precipitous valleys and very steep peaks.

Loculan Point, about 4 miles north-northeastward from

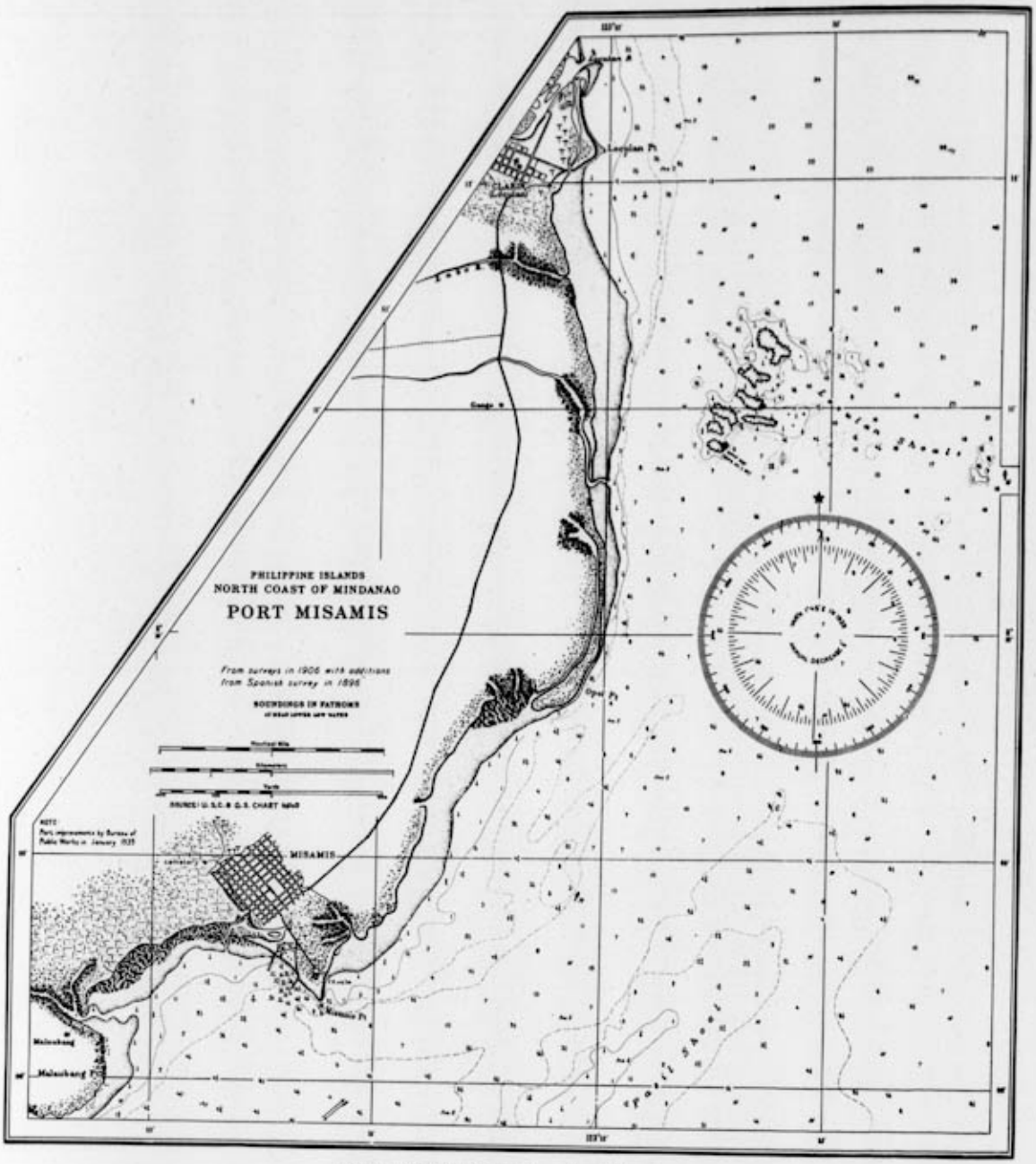

FIGURE IV - 84. *Misamis area, Port Misamis.*
Hydrographic chart of Port Misamis and Misamis town.

Misamis, is low and sandy. The village of Loculan lies immediately back of the point on the Loculan River. The town is small and nearly concealed by trees.

Balicaocao Point, situated 1½ miles northward from Loculan Point, is a rounded, sandy point fringed with coconut trees.

From Balicaocao Point the coast trends northward for 6 miles to Tabu Point, forming a large unnamed bay with a low-lying shore line of sand and mangroves, fringed in most places by coral. The villages of Tudela, Nacavan, and Sinonoc lie on or close to the shores of this bay.

Tabu Point, situated about 7½ miles northward from Loculan Point, is a low, sharp, sandy point bordered by coconut trees. It is very steep-to, a depth of 4 fathoms occurring less than 50 yards from shore.

Jimenez Light, 8° 19′ 34″ N, 123° 51′ 45″ E, was displayed at an elevation of 32 feet above high water from a white concrete tower on the beach at Tabu Point.

The Pálilan River, which discharges about nine-tenths mile northwest of Tabu Point, has very little water on its bar at low water.

The town of Jimenez (FIGURE IV - 85) lies 1½ miles northwestward from Tabu Point and about 1 mile from shore. It may be recognized, when well offshore, by a prominent white stone church with a square tower and hemispherical dome, which shows through the trees. There are many small streams along the coast in this vicinity.

From Tabu Point the coast trends in a general 348° true direction for 6½ miles to Balaring Point.

Mapaan Point, about 3½ miles northward from Tabu Point, is a low, sandy point covered with coconut trees, and fringed by reefs to a distance of about ½ mile.

The town of Aloran lies about 4 miles northward from Jimenez and 1 mile back from the shore; it is not visible from seaward. The landing place is marked by an iron-roofed warehouse and several nipa houses.

Balaring Point is a round sandy point, bordered with mangroves and nipa, with a strip of coconut trees about 100 yards from the shore. It is fringed by reefs to a distance of about ¼ mile. From Balaring Point the coast trends northwestward for 3 miles to Simio Point, a low sandy point covered with coconut trees and fringed by reefs to a distance of nearly ¼ mile.

The village of San Vicente lies about 1½ miles southwestward from Simio Point and ¾ of a mile inland. From seaward it is entirely concealed by trees.

Oroquieta, the capital of Misamis Occidental province, lies about 1 mile northwest from Simio Point, on the left bank and at the mouth of the Oroquieta River. It is easily recognized by a large warehouse, visible from a long distance northward, and also by the church, which stands close to the beach and is unusually ornamental. The Oroquieta River has about 1½ feet of water on its bar at low water.

There is a wharf in Loboc Cove, about 1 mile northwestward from Oroquieta.

Paypayan Bay, between Napolo and Layaban Points, 2 and 2½ miles northwestward from Oroquieta respectively, is fringed by a wide reef.

Layaban Point is a low sandy point bordered with coconut trees, which grow so closely together that the point has the appearance of a high bluff when seen from a distance. The reef which fringes Paypayan Bay also surrounds Layaban Point, has a general width of about ½ mile, and continues northward to Silanga Island.

Silanga Island is a small island, covered with trees about 60 feet high, lying on the reef close to shore about 2¼ miles northward from Layaban Point. The reef which surrounds Silanga Island extends to a distance of about ⅜ mile eastward from the island.

From Silanga Island the coast trends northwestward, then northward, and finally eastward to Polo Point, which bears 21° true, distant nearly 3 miles from Silanga Island. The resulting indentation, known as Polo Bay, is almost filled by reefs.

Polo Point is a low rocky promontory. Behind it is a mangrove swamp, through which there is a high-water passage for small boats to Inamucan Bay. Polo Point is fringed by a very narrow steep-to reef; depths of over 50 fathoms are found less than ½ mile from it.

Polo Point Light, 8° 35′ 59″ N, 123° 45′ 21″ E, was exhibited at an elevation of 60 feet above high water from a white steel-framed structure on Polo Point. A small concrete dwelling stands at the base and to the east of the tower.

Capayas Islet is a very small island composed of coral rock, lying 1¼ miles 156° true from Polo Point lighthouse. It is about 100 yards long east—west and 50 yards wide. Bushes about 5 feet high grow upon it.

(3) Anchorages.

Anchorage may be found eastward from Loculan Point in 6 fathoms, fine sand bottom.

A chain of reefs begins about ½ mile northeastward from Balicaocao Point and extends northward to within 1 mile of Tabu Point. Between these reefs and the land there is an expanse of water where anchorage, well sheltered from the sea during the northeast monsoon, may be found in depths of 3 to 20 fathoms, mud and sand bottom. Access to this anchorage may be had through channels between the reef lying eastward of it, or from the northward. Care must be taken to avoid a 1½-fathom patch lying in the middle of the northern entrance, 1 mile 188° true from Tabu Point.

Between Madre and Poricos Reefs and the shore, is good but contracted anchorage. A number of channels lead between the reefs to this anchorage; the southern one is that generally used.

For anchorages off Jiminez, see Chapter VI.

Anchorage for communicating with the town of Aloran may be found in about 16 fathoms, off the edge of the shore reef, with the warehouse bearing 249° true, distant about ⅜ of a mile.

Anchorage for the town of San Vicente may be found in 4 fathoms about ⅜ mile southward from some houses on the beach, just northward of the mouth of the San Vicente River.

For anchorages off Oroquieta, see Chapter VI.

The anchorage at Loboc Cove is very contracted and vessels are obliged to moor fore and aft, but it affords shelter in all but the heaviest weather.

Paypayan Bay, between Napolo and Layaban Points, is fringed by a wide reef, leaving anchorage space at the entrance, southwestward from Layaban Point. This anchorage is nearly ¼ mile in extent with a depth of 3½ fathoms in the middle.

Polo Bay is almost filled by reefs, in which there are 2 breaks where sheltered anchorage may be found. The better of the 2 anchorages is about 1 mile southward from the lighthouse on Polo Point.

(4) Dangers to navigation.

Loculan Shoals, lying ½ to 1¼ miles from shore, about midway between Opol and Loculan Points, consist of sand and rock. Parts of the shoals bare at low water. Near the southwestern part of the shoals a small sand cay bares at extremely low water. Trunks of large trees, stranded by the currents, may often be seen upon the shoals. There are 3 shoal spots covered by ½ to 2 fathoms lying southward and eastward from Loculan Shoals. Between these shoal spots and the main shoal there is a deep narrow channel.

There are several detached reefs off Balicaocao Point, and it should be given a berth of at least 1 mile.

A chain of reefs, parts of which bare at low water, begins about ½ mile northeast from Balicaocao Point and extends northward to within 1 mile of Tabu Point. The outer edges of these reefs, which are steep-to, lie over 1½ miles from shore.

Madre, Poricos, and a number of other reefs, parts of which are awash at low water, face the shore in the vicinity of Tabu Point and the Palilan River. They are usually well defined and easy to pick up.

The first 2½ miles from Tabu Point to Polo Point are faced by detached reefs to a distance of about 1 mile. Thence to Balaring Point, the reefs which fringe the shore do not extend seaward for a distance of over ½ mile and there are few off-lying dangers.

A rocky shoal, with a least depth of about 1¾ fathoms at low water, has been reported to exist 1 mile 345° true from Balaring Point.

Polo Bay is almost filled with reefs. There are no aids to navigation, and in the absence of local knowledge, a stranger should not attempt to enter the anchorages except at low water, when the edges of the reefs can be made out.

Iligan Reef is a dangerous reef about 600 yards in diameter, composed of coral and white sand, and covered by a least depth of 1½ fathoms, which lies 7¾ miles 64° true from Polo Point lighthouse.

(5) Landing beaches.

(a) Jimenez beach. (PLAN 24, Section C(f); FIGURE IV - 85) Reliability POOR.

1. Location and extent. A beach area extends along the west shore of Iligan Bay for about 8 miles from the southern shore of Tabu Point to Balaring Point. This beach consists of several portions separated by areas of mangrove and interrupted by stream mouths. The width reaches a maximum of about 200 feet, but in many places is considerably narrower. The limits of the beach area are 8° 19′ 20″ N, 123° 51′ 10″ E, to 8° 25′ 50″ N, 123° 50′ E. Landmarks include Tabu Point, low, sharp, and sandy; a prominent white stone church in Jimenez; and the round, sandy point of Balaring. A light was shown from Tabu Point.

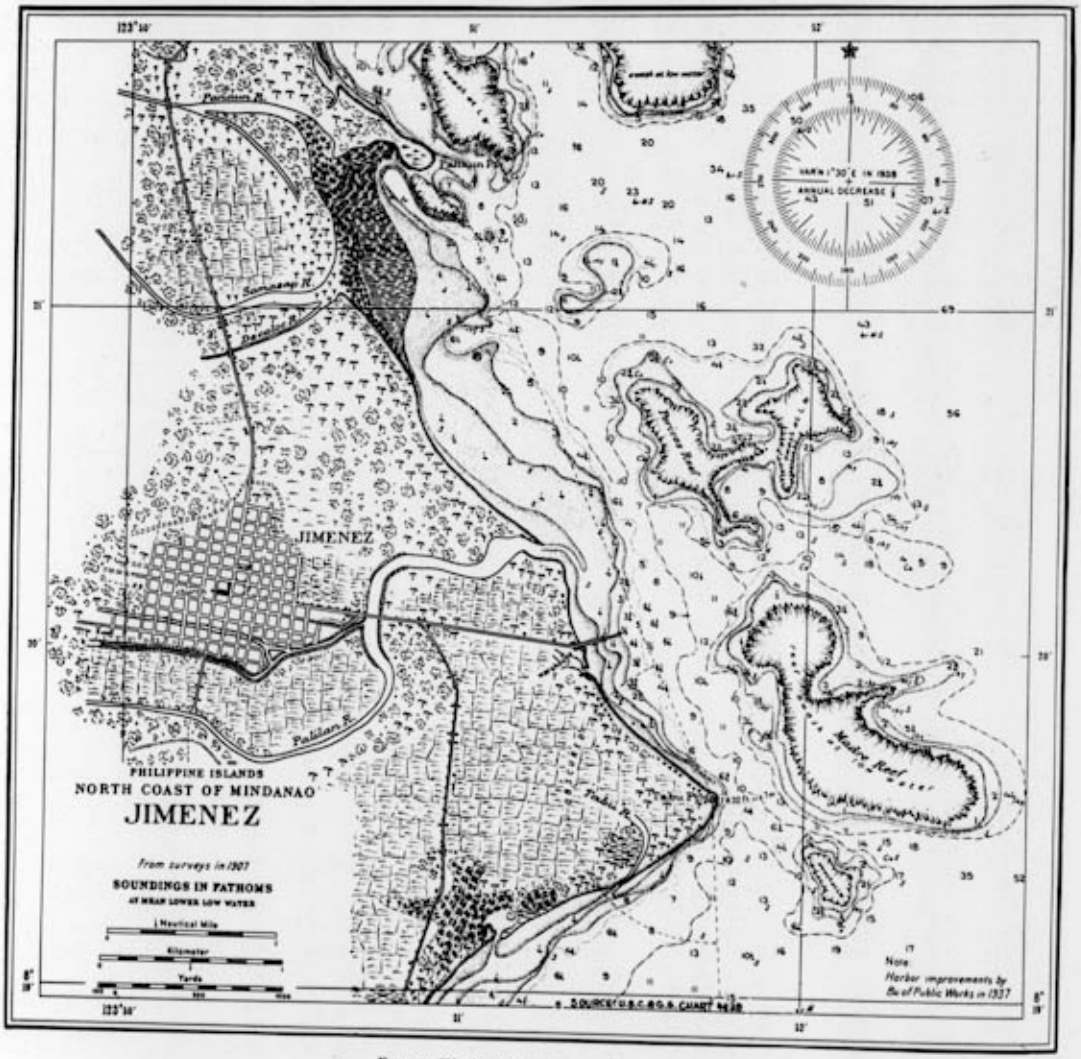

FIGURE IV - 85. *Mitamis area, Jimenez.*
Hydrographic chart of Jimenez on W shore of Iligan Bay.

2. Nearshore. A number of offshore coral reefs obstruct the approach to this beach. These include Madre Reef and Poricos Reef, as well as several others which are awash at low water and are usually well defined. These reefs extend northward along about the southern ⅗ of the beach area (FIGURE IV - 85). The bottom slopes within the 30-foot-depth line vary from gentle to steep, with the steeper portions in the vicinity of Tabu Point. Shifting bars occur near the mouths of the larger streams, notably the Palilan River, which enters the bay at Jimenez. Bottom materials are mainly sand and mud with some rocky patches. This part of the coast is exposed to winds and waves from the northeast but is relatively sheltered during the southwest monsoon. Heavy swell occurs during the northeast monsoon. The mean tidal range is about 3 feet and the tidal current moves northward along the coast on flood.

3. Character of beach. The beach between Tabu Point and Balaring Point is composed of sand, which is locally muddy near the mouths of some of the streams which interrupt it. These interruptions are several in number and include the Palilan River, the Samasap and Panaun Rivers, as well as the Aloran River, which enters the bay a few miles south of Balaring Point. At the mouths of the Samasap and Panaun Rivers is an area of mangrove nearly a mile long, fronted by a tidal flat. The beach is generally relatively flat although it steepens along some of its narrower portions. The firmest parts of the beach are near its 2 ends, especially the stretch for about ½ mile northwest of Tabu Point. Soft parts of the beach occur in the more sheltered areas and adjacent to some of the river mouths. The only structure along the beach is a pier 700 feet long, terminating in 20 feet of water, located a little more than ½ mile northwest of Tabu Point. When waves are running, the surf breaks in a broad belt along most of the shore. Shore drift is prevailingly southward along the beach area.

4. Adjacent terrain and exits. The beach area is backed in general by a low coastal plain which is locally swampy. In part the beach area is backed immediately by coconut groves which are succeeded inland by rice fields or by dense natural vegetation. Along Tabu Point and extending northwestward nearly as far as the pier, a bank 4 to 5 feet high lies immediately behind the beach and in turn is lined with a number of houses. The town of Jimenez lies nearly a mile inland along the Palilan River, but a good road leads to the pier, with a connection running southward through the rice fields of Tabu Point. This road continues northward from Jimenez connecting the several villages of Mapaan, Mojon, and Aloran. A transmission line parallels the road.

(*b*) *Oroquieta beach.* (PLAN 24, Section C(g); FIGURE IV - 86) Reliability POOR.

1. Location and extent. A good sand beach occurs at Oroquieta and extends southward interruptedly as far as Balaring Point. This 5-mile stretch of coast along the western shore of Iligan Bay is bounded by 8° 25′ 50″ N, 123° 50′ E, and 8° 30′ 10″ N, 123° 48′ E.

2. Nearshore. The approach to this area is obstructed by a shoal whose position is doubtful but is said to be about 1 mile northward of Balaring. The bottom slopes within the 30-foot depth are gentle to moderate. At several places the shore is fronted by a fringing coral reef, notably at Balaring Point, Simio Point, and northwestward of Oroquieta (FIGURE IV - 86). This stretch of shore is exposed to winds and swells from the northeast; the latter frequently are heavy in season. The mean tidal range is about 3 feet and the flood tidal current moves generally northwestward along the shore.

3. Character of beach. The main part of the beach extends northwestward from the mouth of the Oroquieta River for about 1 mile, fronting the town itself. However, the beach continues southeastward on the other side of the river and continues with interruptions as far southeast as Balaring Point. The interruptions consist mainly of 4 river mouths and some local mangrove or swampy areas. The beach is composed mainly of coral sand and is generally firm, especially where it fronts the town of Oroquieta. The slopes are, in general, flat but may be as steep as 1 on 10 where the beach is fronted by a fringing coral reef. A pier 600 feet long leads across the fringing reef at the settlement of Loboc, about 1 mile northwest of the Oroquieta River mouth. Here the reef is interrupted by a cove which narrows it considerably in front of the beach. Elsewhere the reef attains a width of as much as 1,500 feet, as shown in FIGURE IV - 86. Surf is heavy when swell approaches from the northeast. Shore drift is variable, but is predominantly southward.

4. Adjacent terrain and exits. The terrain inland of this beach area is a low coastal plain, swampy in part. Locally the beach is backed by coconut plantations, but elsewhere native vegetation, including mangrove, occurs. At Oroquieta the beach is backed directly by the streets of the town, which are easily accessible. The main coastal highway swings westward from Oroquieta, but a secondary road or trail continues northwestward along the coast to Baliangan Point.

I. Zamboanga Area: Sindangan Point to north end Baligian Bay.

(PLANS 24 and 25; U.S.C. and G.S. charts 4605 and 4651)

(1) Offshore zone.

The 10-fathom line lies from about 450 feet to 2¼ miles offshore. It is closest to the shore off Coronado Point and farthest off Quipit Point. Water less than 100 fathoms deep extends for over 6 miles seaward from Quipit Bay and Quipit Point and from Bulatinao Point. However, a depth of 1,355 fathoms occurs 5 miles west-northwestward of Sampoak Point.

The bottom sediments within the 100-fathom curve consist of sand and coral debris, or coral limestone. Beyond it they are composed of muds with a very few sand patches.

Tide rips occur eastward of the northeastern end of the channel between the Murcielagos Islands and Quipit Point, and are also found off Coronado Point.

(2) Coastal topography.

Sindangan Point consists of undercut cliffs and rocks, 20 to 50 feet high, with deep water close to shore on the east side. Shoal water extends about 300 yards from the north and west sides. The point itself is flat on top and heavily wooded, and when seen from northward appears to rise gradually to a 2,150-foot peak. From the south and west this slope appears broken by a series of hills which rise step by step to the high land inland.

The Patauag River has less than 2 feet of water over the bar, but inside the bar the river has depths of 5 to 10 feet, and can be ascended for 2 miles.

Sawigan and Quipit Points are low, flat and sandy. Mount Dansalan, lying about 5 miles inland, has an elevation of 2,355 feet and forms an excellent landmark for this vicinity. The Quipit River empties into the west part of Quipit Bay. It has 3 feet

FIGURE IV - 86. *Misamis area, Oroquieta.*
Hydrographic chart of Oroquieta, W shore Iligan Bay.

of water on the outer bar and may be ascended about 2 miles by small boats.

The Murcielagos Islands are 2 small islands lying on an oval reef about 3 miles off the coast. The reef is about 1 mile long, steep-to, with an 11-foot shoal off its eastern end. The eastern and larger island is about 40 feet high to the tops of the trees.

Sibalic Point is clear and steep-to. The shore in the vicinity is bold, with short stretches of sand and shingle beach between the rocky points. Large trees and underbrush line the beach. The tops of the higher hills and mountains are heavily wooded, but the lower slopes have large open stretches of cogon grass.

Coronado Point, 7° 57′ N, 122° 13′ E, is fairly prominent from the southwest. In the vicinity of Coronado Bay there are localities where cliffs along the shore rise to heights of at least 200 feet. The rivers emptying into the bay are all small and can only be entered by small boats at high water. During the dry season some of them are entirely closed. Between Coronado Bay and Baligian Bay the coast is very rocky and rugged.

(3) Anchorages.

Quipit Bay affords anchorage, protected from the southwest. The best approach is from the northeast, passing ½ mile off Sawigan Point.

An anchorage, protected from the northeast, may be found in Coronado Bay, just southward of Coronado Point, in 10 to 20 fathoms.

(4) Dangers to navigation.

Shoals with depths of 1½ to 4¾ fathoms lie from 1 to 1½ miles offshore from Quipit Bay. The channel between the Murcielagos Islands and the shoal water extending northward of Quipit Point has depths of 16 fathoms, with one shoal of 6½ fathoms lying 1 mile southward of the larger island.

Shoals with depths of 1¾ and 6¼ fathoms lie 2 miles southwestward of Coronado Point. There are depths of 2 and 4¼ fathoms closer inshore 2 miles southward of the point.

(5) Landing beaches.

(a) Quipit Bay beaches. (PLAN 24, Section D(a)) Reliability POOR. A beach area extends along the north shore of the Zamboanga Peninsula from Sawigan Point westward past the Quipit River. The total length of the beach is 5½ miles, but it is not continuous along its entire extent. The beach varies in width, attaining a maximum of 100 feet or less at Quipit Point. The limits of the area lie at 8° 04′ 30″ N, 122° 30′ 50″ E, and 8° 03′ 40″ N, 122° 26′ 40″ E. The coast in this area is low and offers no conspicuous landmarks, although Mount Dansalan, about 5 miles southwest of Sawigan Point, rises to 2,355 feet.

The approach to this beach area is obstructed by numerous shoal areas lying about 2 miles offshore as well as by Murcielagos Island. Within the 30-foot depth the bottom gradient is moderate with shifting sand shoals around the mouth of the Quipit River and northwestward. A fringing coral reef lines the shore along Sawigan Point. The eastern portion of Quipit Bay is partially sheltered from northeastern wind and swell, but the beach area as a whole is generally exposed over an arc from nearly west to east. The mean tidal range along this coast is about 3 feet, and the flood tidal current moves northeastward along the shore. Tide rips are encountered about 2 miles offshore northwesterly from Sawigan Point.

The beach is composed predominantly of sand, partly of coral near its eastern end. Interruptions occur along the beach, but information is lacking regarding their exact nature. The sand is generally firm, except near the mouth of the Quipit River; the beach slopes vary from moderate to gentle, with the gentlest portions near the river mouth. No structures are known along this beach. Surf may be heavy when waves are running, and it is usually spread over a broad belt offshore.

The terrain behind the beach area is generally low, but rises inland to rugged hilly country. Little information is available regarding the vegetation along the shore; the inland hills are wooded. A trail runs within a short distance of the beach, starting at the village of Quipit and running eastward to join ultimately with the highway northwest of Sindangan Bay.

(b) Sibalic beach (PLAN 24, Section D(b)) Reliability POOR. A sand and shingle beach extends about ½ mile along the shore 1 mile southwestward from Sibalic Point. The beach for part of the distance lies on a sand barrier fronting a small lagoon or tidal swamp. The center of the area lies at 8° 02′ N, 122° 20′ 10″ E. Sibalic Point itself is bold and steep-to. In its vicinity there may be other short stretches of rocky beach but their exact locations are not known.

There are no offshore obstructions in the approach to this beach, and within the 30-foot depth the bottom gradient is moderate. Bottom materials are mainly sand and mud. The entire beach is generally exposed to winds and swell from west through north to northeast. The mean tidal range is about 3 feet and the tidal current flows to the northeast on flood.

The beach is composed of sand and pebbles and is generally firm, especially near both ends. It varies in width, attaining a maximum of about 100 feet. Near the center of the beach a small intermittent stream flows through it, widening into a small swampy lagoon, which immediately backs the beach for a short distance north of the stream mouth. Along this area the beach is generally soft. The beach slopes vary from moderate to gentle, with the flattest portions along the center of the beach. There are no structures on the beach. Surf may be heavy when waves are running.

A coastal plain about ¼ mile wide lies behind the beach. It is thickly covered with a native growth of trees and underbrush, and rises inland to hills with elevations of about 500 feet within 1 mile of the shore. The hills are generally wooded, but with large areas of cogon grass along the lower slopes. The area is only sparsely inhabited and no roads or trails of importance pass through it.

(c) Coronado Bay beach. (PLAN 25, Section D(c)) Reliability POOR. A sand beach extends along the inner shore of Coronado Bay for about 3 miles southwestward from a point about 1¼ miles southeast of Coronado Point. It varies from about 75 feet to 150 feet in width. The limits of the beach are 7° 55′ 50″ N, 122° 13′ 45″ E, and 7° 53′ 35″ N, 122° 12′ 45″ E. Coronado Point is bold and is fairly prominent from the southwest.

A shoal area with least depth about 10 feet lies about 2 miles southwest of Coronado Point and about the same distance offshore from the center of the beach. Two other shoal areas, least depths 12 feet and 24 feet, lie about ½ mile offshore from the beach, and about 1½ and 2 miles south of Coronado Point, respectively. However, within the 30-foot depth, no hazards occur in the approach to the beach and the bottom slopes are moderate. Bottom materials are mainly sand and mud. The beach is generally protected from the northeast monsoon winds and from waves and swell from that direction. It is, however, exposed to the west and southwest. The mean tidal range is about 3 feet, and the flood tidal current moves generally northeast. Tide rips occur about 2 miles westward of Coronado Point.

The beach is composed of sand and is interrupted by at least 5 small rivers; it is generally firm, with somewhat softer portions occurring near the river mouths. The slope is moderate, flattening near the center. There are no structures along the beach. Surf may be relatively heavy especially during the summer months when the southwest monsoon winds predominate. Shore drift is variable, but moves predominantly northeast and north along the beach.

The beach is backed by a narrow coastal plain which is covered with a dense native vegetation. Narrow stream valleys extend inland for some distance between the steep slopes which rise behind the coastal plain. Steep slopes dominate both ends of the beach. No settlements or well-defined trails are known to exist.

J. Zamboanga Area: Baligian Bay to Zamboanga.

(PLANS 25 and 26; U.S.C. and G.S. charts 4511, 4605, 4645, and 4651)

(1) Offshore zone.

The 10-fathom line lies from less than ⅛ to ¾ mile offshore. The 100-fathom curve lies ¼ to 3½ miles from the coast as far south as Dumagasa Point, where it swings westward for over 14 miles along the edge of a great bank which connects the Zamboanga Peninsula with the Sulu Archipelago. Depths ranging from over 800 fathoms to over 1210 fathoms occur within 5 miles of the coast between Sampoak and Limasun Points.

The bottom sediments within the 100-fathom zone north

of Dumagasa Point consist predominantly of sand and coral debris with a few coral heads. On the bank connecting the Zamboanga Peninsula with the Sulu Archipelago the bottom is composed of coralline limestone and quartz or coral sands in about equal proportions.

The deeper water sediments consist primarily of muds as far south as Limasun Point. Between Limasun Point and the north edge of the 100-fathom bank they are composed almost entirely of sand with a little coralline debris.

Strong tidal streams and rips occur between Batorampon Point and Zamboanga along almost the entire coast. The tide streams toward Caldera Point, the southwesternmost extremity of the peninsula, with unusually great force.

(2) Coastal topography.

Condulingan Island is steep-to, but should be given a berth of about 500 yards.

Port Santa Maria is not easily seen from vessels passing at a considerable distance offshore. Mount Santa Maria, 646 feet high, is a rather sharp, triangular hill and makes a good landmark. About ⅓ mile northeastward of it is a cogon-covered hill, with a bushy tree growing out of a 15-foot tower, which is easily recognized from west and northwest. The shore at the entrance to the bay is made up of rocks and cliffs, but at the head of the bay itself there are some sand beaches. The hills to the northward are heavily wooded, but to the southward are partly covered with cogon grass. A coral reef extends about 300 yards northward of the point which projects from the south shore of Santa Maria Bay.

South of Port Santa Maria the mountains rise abruptly from the ocean, forming a high rocky coast. During the southwest monsoon a tremendous swell sets in against the rocks.

Dulunguin Point, 7° 44′ N, 122° 05′ E, 2 miles southwestward of Port Santa Maria, is rocky and steep-to. A group of 3 rocks, 7 feet high, lie ¾ mile north of Dulunguin Point, and about 300 yards offshore.

The Siokun River which empties into the northern part of Siokun Bay, has about 4 feet of water on the bar at half tide, and is 200 to 300 feet wide at the mouth. Small launches can ascend the river for about 3 miles. There are several square miles of cultivated land in the river valley. The 245-foot hill on the north bank of the Siokun River is quite prominent and forms a good landmark for the northern part of the bay. The village of Siokun lies on the beach near the river mouth.

Sikanan Point, the southern entrance point to Siokun Bay, is a steep rocky hill.

A good landmark for approaching Panabutan Bay is the 680-foot hill back of Balatacan Point. The hill is heavily wooded with the exception of the lower slope on its southern side. Only a few broken piles mark the site of the extensive wharf that formerly stood on the eastern side of Panabutan Point. There are no currents in the bay. The Panabutan and Siraguay Rivers are small; the latter may be entered at high water by a small boat drawing not over 2½ feet. The flood plain of the Panabutan River is cultivated for a distance of 4 to 5 miles above its mouth.

Between Panabutan and Sibuco Bays the points along the coast are usually rocky and steep-to, with small mountain streams emptying into the bights between them.

There is an islet close inshore southward of Mantigug Point. A small beach occurs near the point.

Batotindoc Point is high and steep, with a pinnacle rock just detached from the shore line. This rock can be seen only when close inshore to the north or south.

The terrain behind Sibuco Bay is mountainous, very rough, and heavily wooded.

From Pangian Point, the southward entrance point to Sibuco Bay, the coast trends southwest with a curve to southward to Batorampon Point, the most western point of Mindanao. For most of this distance the mountains extend down to the coast, which is rugged and steep (FIGURE IV - 87). The mountainous interior is heavily timbered and extremely rough. The rivers are all small and cannot be entered by small boats except at high water.

A very small coastal flat, bordered by a sandy beach, lies just north of Alimpaya Point. The timber line extends down to within about 200 feet of the beach along this flat.

Batorampon Point, 7° 07′ N, 121° 54′ E, is a small hill, 450 feet high, close to shore, with somewhat lower ground behind it. It is flat on top and densely wooded. Southward of Batorampon Point the coast curves gradually to the eastward and is low, covered with trees, and bordered with steep sandy beaches. Small rocky stretches occur locally.

The coastal plain between Batorampon Point and Zamboanga varies in width from less than ¼ mile behind Caldera Bay to 2½ miles back of San Ramon Penal Colony and Zamboanga. Most of it is relatively flat and covered with coconut plantations and occasional rice fields. It merges inland with the rocky, rugged, heavily wooded, mountainous interior.

A good 2-way gravel highway follows the beach rather close-

FIGURE IV - 87. *Zamboanga Peninsula, SW coast.*
Typical steep wooded coast SW of Sibuco Bay, near Alimpaya Point, looking S. January 1940.

ly from the village of Labuan, 1 mile south of Batorampon Point, to Zamboanga.

At Labuan numerous large rounded boulders are scattered over the tidal flats in front of a rocky and sandy beach. The terrain immediately behind the beach is unusually hilly.

The bottom off the village of Patalon, ¾ mile south-southeastward from Dumagasa Point, is rocky but fairly level. The coastal plain behind the town is flat for several kilometers inland.

At San Ramon Penal Colony the buildings are quite prominent and form a good landmark.

Caldera Point is a low sandy peninsula, covered by coconut palms to its end, which forms the western entrance point to Caldera Bay.

From Caldera Point the coast trends east-southeastward for 7 miles to the town of Zamboanga. It consists of sand beaches with a few low rocky bluffs.

(3) Anchorages.

Baligian Bay affords good anchorage in 5 to 15 fathoms, protected from the northeast but open to westward. The entrance southward of Condulingan Island is recommended, as the channel between the island and the northern entrance point of the bay is restricted by shoal water extending off the point.

Nunuyan Bay (U.S.C. and G.S. chart 4651) offers a very good anchorage during the southwest monsoon. Sampoak Point cuts off the force of the wind and swell, but this bay offers little protection during the northeast monsoon.

For anchorages off Port Santa Maria, see Chapter VI.

Siokun Bay affords anchorage in the northern part, sheltered from the northeast wind and sea, but necessarily close in on account of the great depth of water.

Panabutan Bay (U.S.C. and G.S. chart 4651) affords sheltered anchorage in northeast and southwest monsoon weather, with Cauit Point breaking the force of the latter. The best shelter is in the northern part of the bay in 10 fathoms, sand bottom.

Piacan Bay (U.S.C. and G.S. chart 4651) affords good protection during southwest weather. The approach to the anchorage may be either northward or southward of Pina Island.

Kauit Bay is open to westward and southwestward. The best anchorage is in the southeast corner of the bay, fairly well protected from the northeast.

Sibuco Bay (U.S.C. and G.S. chart 4651) has an anchorage in the southeast corner. It offers little protection from either monsoon. The entrance is so large that considerable swell is felt inside.

There is anchorage in Caldera Bay in a depth of 6 to 8 fathoms, sand bottom.

Vessels can anchor, if necessary, off the village of San Mateo, 4 miles eastward of Caldera Point, on a bank of sand in 8 to 15 fathoms of water; but elsewhere along the coast the bottom is foul and uneven.

(4) Dangers to navigation.

A shoal with a least depth of 2¾ fathoms lies ¾ mile south of Dulunguin Point and ½ mile offshore. This shoal is dangerous to vessels rounding the point into the northern part of Siokun Bay.

A rock awash at low water lies 100 yards off Balatacan Point. This rock is a danger to small vessels rounding the point close in, as it is hard to see in calm weather at high water.

In Panabutan Bay, southward of the mouth of the Siraguay River, a coral reef makes offshore for 650 yards, with a rock awash 100 yards off the point of the reef. This is the only danger to navigation in Panabutan Bay.

Between Pangian Point and Batorampon Point the coast is clear and free from dangers with the exception of the Migalog Rocks, which lie close to shore about 220 yards northward of the village of Lintangan, and are a danger to vessels approaching from northward to anchor off that place.

When approaching Batorampon Point from the north by night, care must be taken to avoid Alimpaya Point, which is low and flat and does not show well against the higher point to the southward.

(5) Landing beaches.

(a) Baligian Bay, Nunuyan Bay, and Puerto Santa Maria beaches. (PLAN 25, Section D(d); FIGURES IV - 87 to IV - 89) Reliability FAIR.

1. Location and extent. Several small sand beaches lie along the heads of Baligian Bay, Nunuyan Bay, and Puerto Santa Maria. The head of Baligian Bay lies about 7° 48′ N, 122° 09′ E; the head of Nunuyan Bay about 7° 47′ N, 122° 07′ E; and the head of Puerto Santa Maria about 7° 45′ N, 122° 07′ E. A good landmark for the area is Mount Santa Maria, a sharp triangular hill 646 feet high, lying about ¾ mile south of the southern entrance to Puerto Santa Maria.

2. Nearshore. Condulingan Island, lying off the northern portion of Baligian Bay, is the only offshore hazard in this stretch of coast. Within the 30-foot depth the slopes are steep off the points separating the bays, but more moderate within the bays opposite the beaches. The area is generally fronted by a fringing coral reef except in the southern arm of Nunuyan Bay (FIGURE IV - 88). Along the southern part of Baligian Bay, the reef attains a width of about 800 feet, but elsewhere it is generally about 300 feet along its widest portions. The beaches in Baligian Bay are protected from wind and swell from the northeast, but are generally exposed to the west; while Nunuyan Bay is more protected from wind and swell from the southwest. The beaches in Puerto Santa Maria, on the other hand, are well protected in all weather. The mean tidal range is of the order of 2.5 feet, and the flood tidal current flows northeastward offshore. Tide rips occur about a mile offshore from Sampoak Point between Nunuyan Bay and Puerto Santa Maria.

3. Character of beaches. All the beaches in these small bays are moderately firm, and they have slopes which range from steep to moderate. The beaches are composed of sand, mainly of coral origin. No structures occur along the beaches except for a private pier on the northwestern part of the easternmost beach in Puerto Santa Maria. The intensity of the surf varies greatly over these beaches, and is essentially negligible on those situated along coves within the bays. Shore drift is variable and weak.

4. Adjacent terrain and exits. The terrain inland of these several bays is generally rugged, with some narrow coastal plain areas behind the bayhead beaches. The hill slopes are heavily wooded (FIGURES IV - 89 and IV - 90). A trail runs from Baligian at the head of Baligian Bay southwestward over the headland separating this bay from Nunuyan Bay, and then runs generally southward near the head of Puerto Santa Maria to Siokun on Siokun Bay.

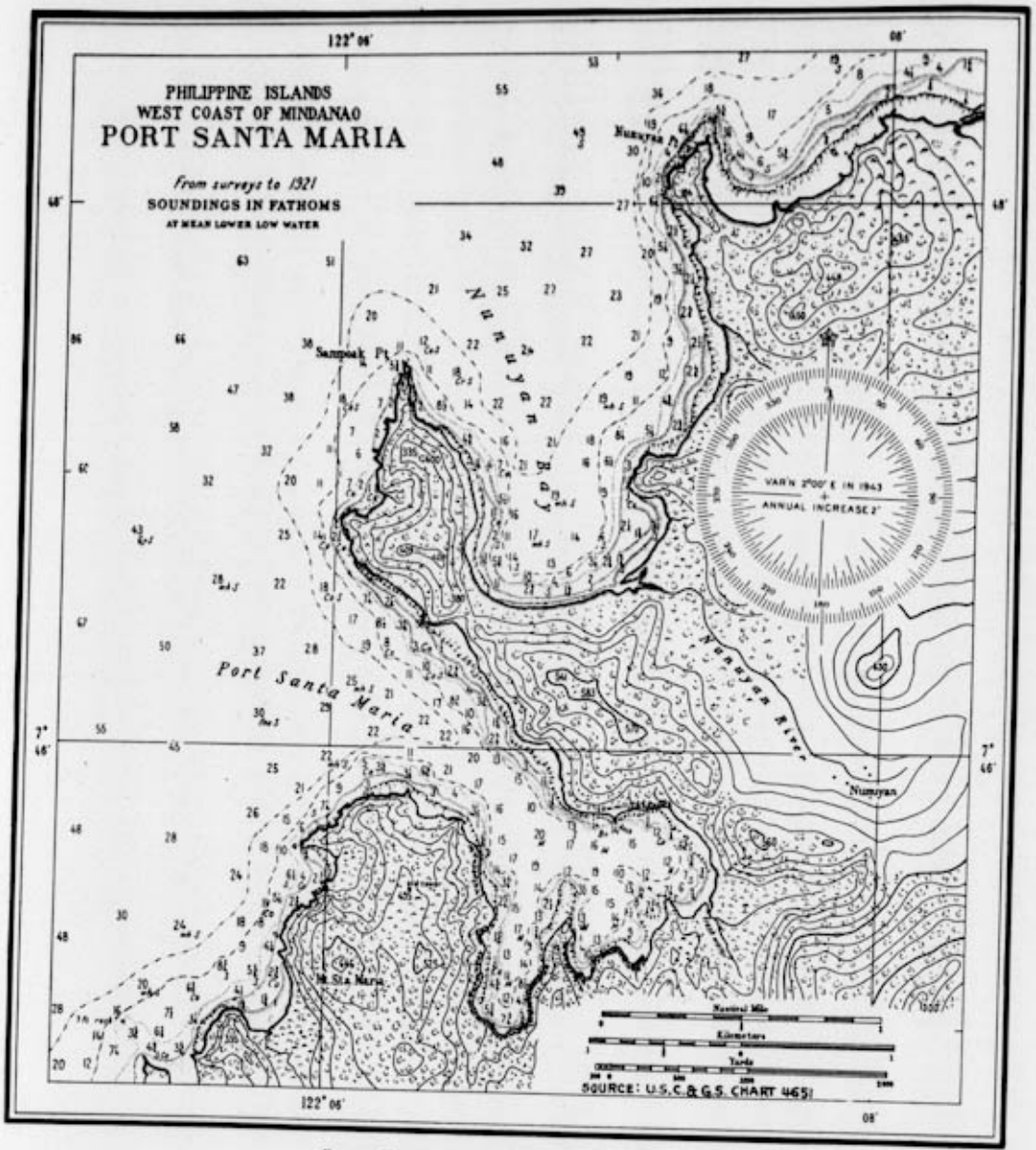

FIGURE IV - 88. *Zamboanga Peninsula, W coast.*
Chart of Nunuyan Bay and Puerto Santa Maria.

(*b*) *Siokun Bay beach* (PLAN 25, Section D(e)) Reliability POOR. A sandy beach about 6 miles long extends along the eastern shore of Siokun Bay. It averages about 100 feet in width and, about 2 miles from its northern end is interrupted for some distance by the mouth of the Siokun River. The limits of the beach lie at 7° 43′ 10″ N, 122° 06′ 40″ E, and 7° 38′ 20″ N, 122° 07′ 40″ E. A good landmark for the northern part of the bay is a hill 245 feet high about 2 miles inland along the Siokun River.

The offshore approach to the area is clear except for a shoal about 1 mile south of Dulunguin Point. Shoreward of the 30-foot depth the bottom slopes are moderate to gentle with the gentlest portion in the vicinity of the river mouth, where shifting bars occur. The river itself has about 4 feet of water on the bar at half-tide. The bottom material consists of sand and mud. The area is exposed to winds and swell during the southwest monsoon, but is relatively sheltered from the northeast monsoon. The mean tidal range is about 3 feet and the tidal current moves northward on flood.

The beach is composed of sand which becomes finer and locally muddy near the river mouth. The slope varies from about 1 on 20 to considerably flatter slopes in the vicinity of the river. Away from the river mouth; the beach is generally firm; the best part of the beach for landings is said to be about

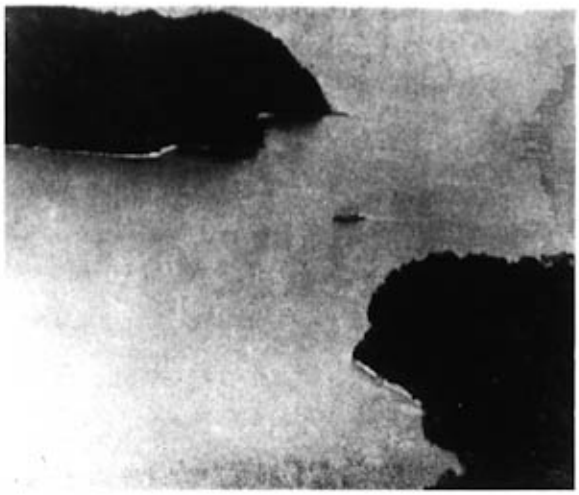

FIGURE IV - 89. *Zamboanga Peninsula, W coast.*
Entrance to Puerto Santa Maria, looking westward toward Sulu Sea.

miles inland along the Siokun River. Most of the plain is covered by coconut groves, with some rice and hemp. A trail parallels the beach along its northern portion leading northward to Baligian Bay. No trails are known to lead inland along the river.

(*c*) *Panabutan and Piacan Bay beaches.* (PLAN 25, Section D(f); FIGURES IV - 91 and IV - 92) Reliability FAIR. Several beaches occur along the shore in Panabutan and Piacan Bays and in small coves between the bays. The limits of the beach areas lie between 7° 35′ 40″ N, 122° 07′ 30″ E, and 7° 31′ 30″ N, 122° 05′ 10″ E. The beaches vary in length from 2 miles in Panabutan Bay to about 1,000 feet in the cove of Pogos Bay. A good landmark for Panabutan Bay is the hill, 680 feet high, located behind Balatacan Point, which itself is located about 1½ miles northwest of the bay entrance. Pina Island with a hill 190 feet high lies in the center of Piacan Bay.

With the exception of this island the approaches to the bay areas are clear. Shoreward of the 30-foot depth the bottom slopes are gentle along the main extent of the bays, but are steeper at the intervening headlands. Fringing coral reefs line the shores at many places, especially along the headlands (FIGURE IV - 91). The bottom material is mainly mud and sand, largely of

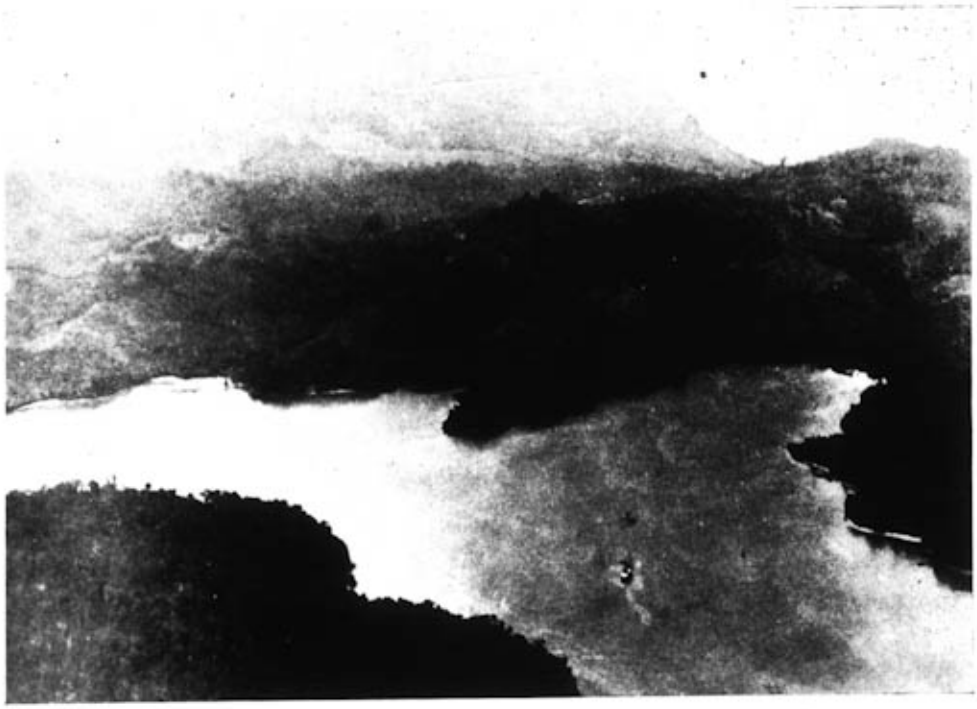

FIGURE IV - 90. *Zamboanga Peninsula, W coast.*
SW part of Puerto Santa Maria, looking southeastward.

½ mile south of the Siokun River. The characteristics of the beach are subject to considerable seasonal variations near the river mouth. A small pier is reported near the river mouth, but its exact location is not known. Surf is moderately heavy when waves are running, and the surf belt is widest near the central part of the beach.

The terrain behind the beach is a broad river plain about 4 miles wide. The settlement of Siokun lies on this plain about 2

coral origin, but there are some patches of rocky ground. The bays are sheltered from the northeast monsoon, although Piacan Bay is exposed to the north. Panabutan Bay is directly exposed to the southwest monsoon and accompanying swell. The mean tidal range is about 2.5 feet and the flood tidal current moves northward along the shore.

The beaches are composed of sand, much of it of coral origin. They are generally firm and have steep to moderate slopes (FIG-

URE IV - 92). In Panabutan Bay the beach is interrupted at several places by stream mouths. One stream parallels the shore before entering the bay. In Piacan Bay, the beach is locally backed by an old river mouth forming a lagoon. The remains of an old pier occur on the east side of Panabutan Point. Shore drift is southward in Panabutan Bay, variable elsewhere. The intensity of the surf varies among the bays, with the greatest intensity along the central portion of the Panabutan beach.

The terrain inland of the beaches is generally rugged, though Panabutan Bay and Piacan Bay have river plains extending inland from their heads; the smaller coves are generally backed by steeper slopes. Coconut groves occur locally behind the beaches, but there are scattered areas of mangrove along some of the streams and the more hilly country is wooded. A trail is reported to run inland from the Siraguay River in Panabutan Bay, and there is a small settlement along the beach in Piacan Bay.

(*d*) *Sibuco Bay beach.* (PLAN 25, Section D(g); FIGURE IV - 92) Reliability POOR. The head of Sibuco Bay is lined with a sand beach about 2 miles long, varying in width up to about 300 feet. The limits of the beach lie at 7° 19′ N, 122° 03′ 50″ E, and 7° 17′ 20″ N, 122° 03′ 30″ E. In addition there are several small beaches scattered along the southern shore of Sibuco Bay as far west as Pangian Point. No conspicuous landmarks are listed for this area.

The offshore approach to the beach is clear (FIGURE IV - 93), and within the 30-foot depth the bottom slopes are moderate. The bottom materials consist mainly of sand and mud. The northern portion of the beach is somewhat protected from northwest wind and swell, but most of the bay opens directly to the west and is subject to wind and swell during the southwest monsoon. The mean tidal range is about 2.5 feet, and the tidal current flows northward on flood.

The beach is composed of non-coral sand with gentle to moderate slopes. The beach is firmest along its central and southern portions, but is reported to be soft along the portion opposite the settlement of Sibuco. Three streams enter the head of the bay, 1 at the northern end, and 2 near the southern end. The Sibuco and Pulidan Rivers flow parallel to the beach for a dis-

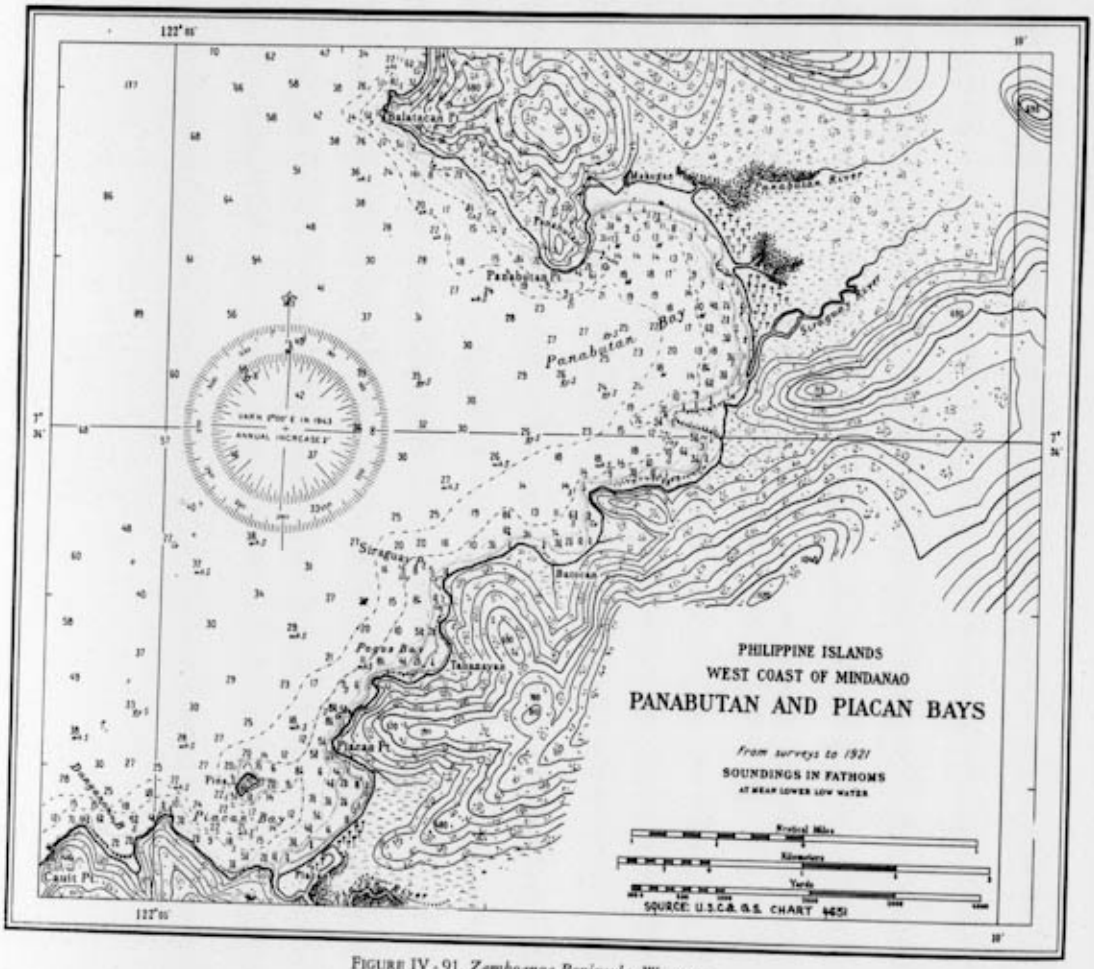

FIGURE IV - 91. *Zamboanga Peninsula, W coast.*
Chart of Panabutan and Piacan Bays.

FIGURE IV - 92. *Zamboanga Peninsula, W coast.*
Beach on NW shore of Panabutan Bay, at site of old lumber mill wharf, looking NW.

tance of nearly 1 mile before entering the bay through a common mouth. There are no structures along the beach. Shore drift is predominantly southward.

The beach area is backed by a coastal plain less than 1 mile wide which extends inland along the rivers. The northern part of the beach is backed directly by coconut groves, but the central portion is backed by a mangrove-bordered lagoon, formed by the stream which flows parallel to the beach. The hills adjoining the plain are wooded. Three trails lead from the small village of Sibuco, one of them crossing the Zamboanga Peninsula to Sibuguey Bay, the second running south to Basilan Strait, and the third running southwestward parallel to the coast.

(*e*) *Patalon beaches.* (PLAN 26, Section D (h); FIGURE IV - 94) Reliability FAIR.

1. Location and extent. Scattered beaches occur on both sides of Patalon for a distance of about 6 miles each way, as far north as Alimpaya Point and as far south as San Ramon Penal Colony. The northern limit of the beach area lies at 7° 09′ 15″ N, 121° 54′ 30″ E, and the southern limit at 6° 59′ 15″ N, 121° 55′ 20″ E. Four beaches are shown on the map, but it is believed that some of them are more extensive than shown and that landings can be made along much of the coast as a whole. The San Ramon Penal Colony is marked by prominent buildings. Batorampon Point is a hill 450 feet high close to the shore.

2. Nearshore. The approach to this stretch of coast is clear to the 30-foot depth. Within that depth the bottom slopes are moderate to steep, and a narrow fringing coral reef is reported to line a substantial portion of the shores. The bottom materials are mainly sand, partly of coral origin. Locally the bottom is bouldery, as at Labuan. This part of the coast is directly exposed to winds of the southwest monsoon, and to the heavy swell which approaches from that direction. The mean tidal range is about 2.5 feet, and the flood current moves northward along the shore. Tide rips develop offshore between San Ramon Penal Colony and Tinuba to the north.

3. Character of beaches. The beaches along this area vary considerably in width, with a maximum of 200 feet at low water at Alimpaya Point, and a minimum of about 20 feet near Patalon. The average width is perhaps 50 feet, as it is in front of the San Ramon Penal Colony (FIGURE IV - 94). The slope of the beach also varies from a maximum of about 1 on 5 along the narrower parts of the beach to nearly flat stretches along the widest portions. The sand is firm except locally at river mouths. No structures are known along any part of this beach area. A low stone wall backs part of the beach at San Ramon Penal colony. The surf is reported to be very heavy during times of southwest swell.

4. Adjacent terrain and exits. Between Alimpaya Point and Batorampon Point the coast is rugged, although a narrow delta plain occurs at the former point. Southward of Batorampon Point a coastal plain extends to the southern limit of the area, widening out considerably in the vicinity of San Ramon Penal Colony. The plain is cultivated in coconut groves along the shore and has rice fields scattered over it. The more hilly country is wooded. A trail parallels the shore from Alimpaya Point as far south as Patalon where it joins the first-class coastal highway which continues southward to San Ramon Penal Colony and beyond. This road is generally accessible from the beach, but a low bank backs the beach at Labuan and Patalon.

(*f*) *Zamboanga beaches.* (PLANS 25 and 26, Section D(i); FIGURES IV - 95 to IV - 98) Reliability FAIR.

1. Location and extent. The 10-mile stretch of coast from Caldera Point southeastward to the town of Zamboanga is largely lined with sand beaches, in part fronted by fringing coral reefs. The beaches are not continuous, but are interrupted by rocky areas and by inlets of river mouths. The limits of this beach area lie between 6° 57′ N, 121° 57′ 50″ E, and 6° 54′ N, 122° 05′ E. Landmarks for this stretch of coast include a factory at Caldera Bay, a radio tower 2½ miles northwest of Zamboanga, a lighthouse on Little Santa Cruz Island, and the city itself which has numerous oil company warehouses.

2. Nearshore. The approach to this stretch of coast is obstructed by the 2 Santa Cruz Islands which lie about 2 miles offshore from the town of Zamboanga. These islands are located on the Santa Cruz Bank which contains several shoal areas; the bank as a whole stretches for about 8 miles in a westerly direction along the Mindanao shore from which it is separated by a channel more than 1 mile wide. Along the main shore the bottom slope within the 30-foot depth varies from steep to gentle; some of the steeper slopes front the coral reefs which stretch along the shore at Caldera Bay and on both sides of Zamboanga (PLANS 25 and 26). The bottom materials are mainly coral sand and mud.

Winds in the vicinity of Zamboanga are prevailingly north and northeast from November through April; in May and June southeast winds prevail and are succeeded by winds of the southwest monsoon starting in July. During the season of southwest monsoon much rain falls. Land breezes blow during the night when the seasonal winds are not strong. The average tidal

range is about 2.5 feet and the flood tidal current moves westward along the shore attaining velocities of 6 knots in the channel between the main shore and Santa Cruz Bank. The prevailing direction of swell approach is from the southwest; this swell is often heavy during the southwest monsoon.

3. Character of beaches. The beaches along this shore are all composed of sand, mainly of coral origin. The shore is apparently not lined continuously with beach, but has several areas of rocky bluff scattered along it. Caldera Point itself is sandy, as is most of the shore of Caldera Bay, except for local stretches which are swampy. Between Caldera Bay and the city, the beaches are interrupted by the mouths of several streams, some of which have inlets at their mouths or are partially closed by small sand spits. The width of the beaches varies considerably, attaining a maximum of about 100 feet in the best developed portions but averaging considerably less. The sand is usually firm and the slopes of the beaches vary from moderate to steep (FIGURE IV - 95). Several structures are located along

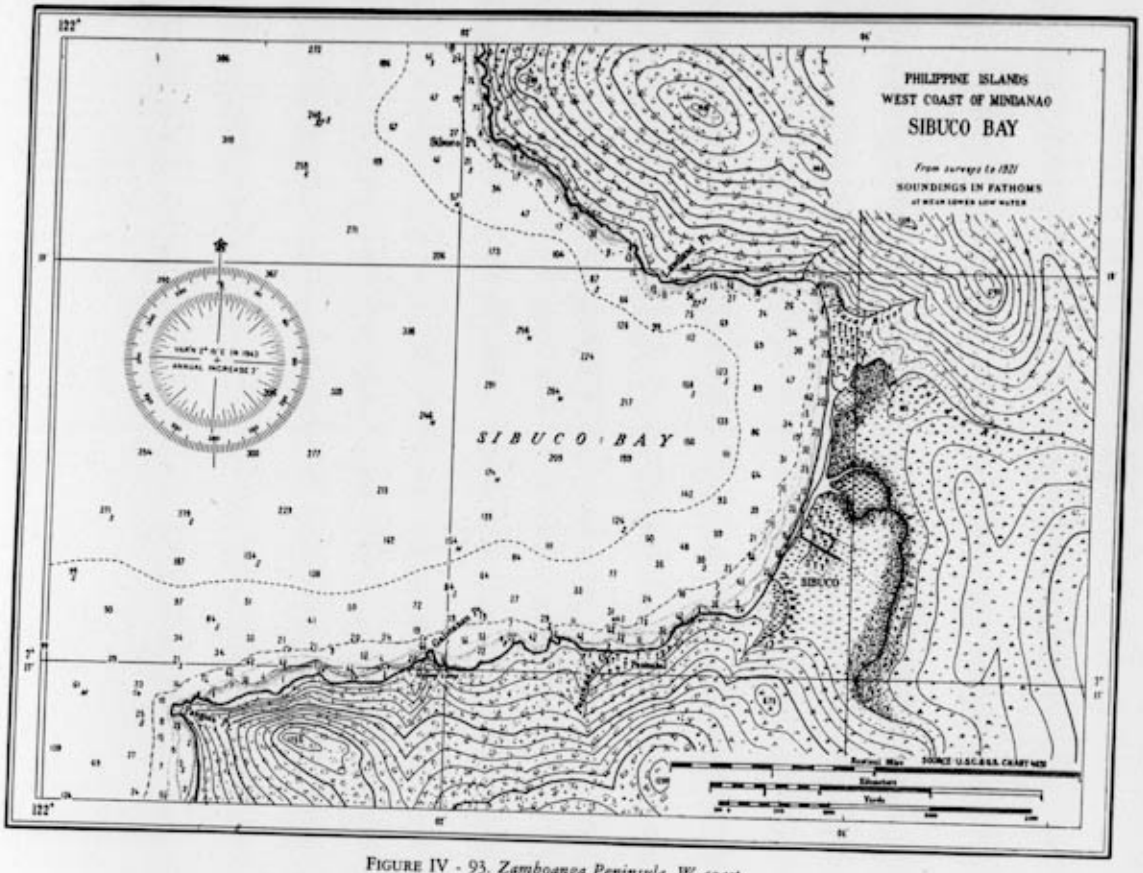

FIGURE IV - 93. *Zamboanga Peninsula. W coast.*
Chart of Sibuco Bay.

FIGURE IV - 94. *Zamboanga Peninsula, SW coast.*
Beach at San Ramon Penal Colony, looking northward.

the shore, and include 2 piers at Baliwasan, as well as the harbor structures at Zamboanga itself (FIGURES IV - 96 and IV - 97). A sea wall lines the shore eastward of the harbor and is shown in FIGURE IV - 98. With the exception of the part of the beach sheltered by Caldera Point, this stretch of coast is exposed to heavy surf during southwest swell. The surf breaks in more than a single line of breakers along most of the shore. Shore drift is variable, but is predominantly eastward.

4. Adjacent terrain and exits. This stretch of coast is backed by a coastal plain which extends inland 4 or 5 miles northwest of Caldera Bay, narrows considerably for about 3½ miles southeast of the bay, and then widens again toward Zamboanga, continuing inland to the northeast (FIGURE IV - 96). Along most of the shore the plain is covered with coconut groves, interspersed with small areas of brush or swamp. An ex

FIGURE IV - 95. *Zamboanga Peninsula, S coast.*
Beach just W of Zamboanga, looking northwestward toward Moro barrio of Cawa Cawa.

tensive mangrove area lies east of Zamboanga. Several small settlements lie along the shore between Caldera Bay and Zamboanga. The main coastal highway runs southeastward from Patalon to Caldera Bay and continues southeastward close behind the shore for about 4½ miles to the village of San Mateo; between Caldera Bay and San Mateo the road is easily accessible from the beach. At San Mateo the road turns inland, then parallels the coast at a maximum distance of about ½ mile, and approaches the shore again at Zamboanga. Several secondary roads lead toward the beach between San Mateo and Zamboanga. The radio station is located opposite Gavilan Point, and an airport lies about 3 miles northwestward of the town. Fresh water is piped to the harbor wharf at Zamboanga.

K. Zamboanga Area: Zamboanga to Taguite Bay.

(PLAN 25; U.S.C. and G.S. charts 4511, 4605, 4645, and 4651)

(1) Offshore zone.

The 10-fathom line lies ¼ to 2¼ miles offshore, being farthest from the coast off the south side of Sacol Island. Within a zone 5 miles offshore depths of 60 fathoms are reached south of Mariqui Point, but are generally less than half that great.

Between Zamboanga and the Panubigan Islands the bottom sediments are sand and coral debris with patches of coral limestone. Between the Panubigan Islands and Taguite Bay fringing coral reefs and sand line the shore, except where interrupted by mud around the river mouths; the deeper water sediments consist of mud with a few sand patches.

Basilan Strait, open from west to east, separates the southwest end of Mindanao from Basilan Island; it is 8½ miles wide and 24 miles long. The Santa Cruz Islands and bank, situated on the Mindanao side, divide the strait into 2 equally navigable channels. The northern channel, although the narrower, is generally preferred by sailing vessels, which can anchor here in case of a calm to avoid being carried away by the current.

In the strait the tidal currents follow the direction of the channel, but near the islands and shoals they follow the edge of the reefs. The currents may attain a velocity of 5 to 6 knots.

(2) Coastal topography.

Little and Great Santa Cruz Islands appear as 1 island when approaching the town of Zamboanga from the westward.

Little Santa Cruz Island is a small, flat, low, wooded island lying on the northern edge of the bank, about 2 miles southwestward from Zamboanga. It is ¾ mile long, east-west, and ⅛ mile wide; each end is prolonged by a reef which dries at extreme low water to a distance of ½ mile. Shoal water 2 fathoms deep extends from the western reef to a distance of 1½ miles from the island.

Little Santa Cruz Light, 6° 53′ 09″ N, 122° 02′ 28″ E, is exhibited 64 feet above high water from a white, steel-framed structure near the middle of Little Santa Cruz Island.

Great Santa Cruz Island lies on the eastern end of the bank southeastward of Little Santa Cruz Island, from which it is separated by a channel 6 to 8 fathoms deep. This island is 1⅓ miles long in a northwest-southeast direction and nearly 1 mile wide; it is low, flat and wooded, and fringed by a narrow reef with 6 to 8 fathoms at its outer edge.

East of Zamboanga there is a wide belt of mangrove swamp which continues to the village of Bolong, narrowing northward. Hills up to 500 feet high parallel the coastal plain and in places extend down to the beach, as at Malasugat Bay, forming a rocky shore line.

The coast trends east-southeasterly from Zamboanga for about 2 miles to Mariqui Point, and thence east-northeastward for 4 miles to the mouth of the Masinloc River. This section of the coast is low, mangrove-covered, and fringed by a narrow reef that bares at low water.

Shoal water extends southeastward and eastward from Mariqui Point, with a depth of 4¼ fathoms about ½ mile southeast.

FIGURE IV - 96. *Zamboanga Peninsula, S coast.*
Aerial view of town of Zamboanga, harbor, and plain, looking southeastward, 15 September 1936.

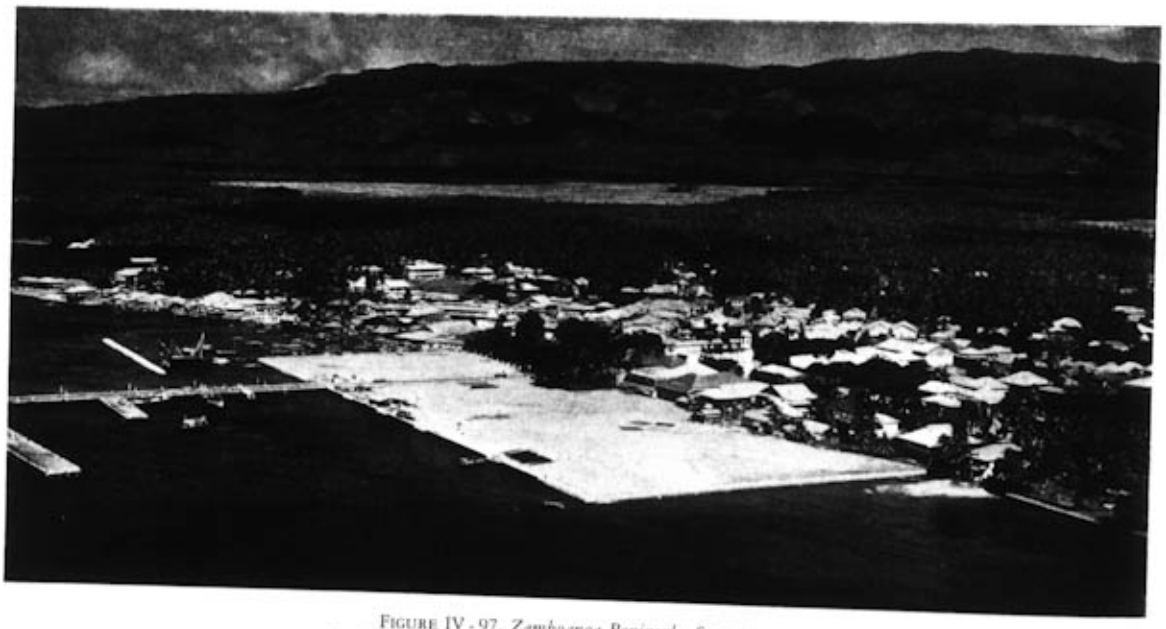

FIGURE IV - 97. *Zamboanga Peninsula, S coast.*
Harbor of Zamboanga, looking northward, 9 January 1939.

FIGURE IV - 98. *Zamboanga Peninsula, S coast.*
Seawall along Zamboanga waterfront, looking northwestward.

From the mouth of the Masinloc River to the northern entrance of Masinloc Anchorage the coast is low, bordered with mangrove, and fringed with reefs. About 2 miles northward from the river's mouth the shore reef begins to widen and gradually attains a width of ½ mile. Masinloc River, which discharges into Masinloc Anchorage, has a least depth of 2¼ fathoms on its bar at low water, but is very narrow and of little commercial importance. The village of Masinloc lies on the south side of the mouth of the river.

Tictauan Island, lying with its northern end 1¾ miles east-southeast from Mariqui Point, is about 2 miles long in an east-northeasterly direction and ¾ mile wide. The island is low and entirely covered by mangroves except along a narrow strip of sand beach at the west end and a larger strip at the east end, in the vicinity of the small native village of Tabtabon. At the end of the island is a wide reef, partly bare at low water. Beyond the reef shoal water, with 2 fathoms at its end, extends about ¾ mile from the land. Shoal water also extends southward and westward from the island, and it is recommended that those sides be given a berth of about ½ mile.

Tictauan Channel, between Mindanao and Tictauan Islands, is ⅜ mile wide at the narrowest part and 10 to 14 fathoms deep. This channel is an area of very strong currents.

Sacol Island, forming the eastern end of Masinloc Anchorage, is 7 miles long in a northeast-southwest direction and about 2 miles wide. The western portion is low and consists mostly of mangrove swamps. In the eastern part there are 2 prominent hills. The southeastern and highest, known as Sacol Hill, rises to 781 feet. Sacol Hill makes a good landmark for vessels approaching from the northward or eastward. From a distance the hills appear as 2 separate islands. The northwestern side of Sacol Island, facing Masinloc Anchorage, is clear and steep-to. The northern and eastern sides are fringed with narrow, steep-to reefs. The southern side is bordered by coral, outside of which foul ground extends to a considerable distance.

Pangapuyan Island is a small island, planted to coconuts, lying close to the southwest end of Sacol. Shoal water, with 5 fathoms at its edge, extends ⅜ mile southwestward from Pangapuyan Island.

Masinloc Anchorage is the name given to the channel between Mindanao and Sacol Islands. From the entrance at Tictauan Channel, which may be considered a prolongation of Masinloc Anchorage, it is about 8 miles to the shoals obstructing the northern end. It is over ½ mile wide at the narrowest part and from 7 to 15 fathoms deep. The Moro village of Taluksangay lies on the western shore of the anchorage. Along the beach in front of the town the mangrove belt is interrupted by extensive coconut groves.

Tulnalutan Island is a small island less than 1 mile wide, clear and steep-to, with a central hill rising to a height of 200 feet. It is situated 3½ miles eastward of the east point of Sacol Island.

Sinonog Island lies 2½ miles eastward from Sacol Island and 2 miles southwestward from Tulnalutan Island, is small and low except on its eastern side, where there is a cliff 100 feet high. It is surrounded by a reef which extends ⅓ mile east-northeastward with 9 to 17 fathoms at its edge.

Malanipa Island lies on the northern side of the eastern end of Basilan Strait, 3½ miles southward of the east end of Sacol Island. It is 1¾ miles long, northwest and southeast, has a greatest elevation of 350 feet, and is wooded. Little Malanipa, a small wooded islet, lies close to its eastern coast.

Coco Island (FIGURE IV - 99) lies 4½ miles north of the northeast coast of Basilan Island. It is about 1 mile long northwest-southeast, ½ mile wide, 460 feet high at the northwest end, and thickly wooded. The shore reef surrounding it is steep-to at a distance of 400 yards. Little Coco Island, lying 600 yards northwest of Coco Island, is of moderate height, round-topped and covered with vegetation. Between the 2 there is a navigable channel 400 yards wide, with depths of 3¾ to 6 fathoms, with a bottom of sand and stones.

FIGURE IV - 99. *Coco Island, SE of Zamboanga Peninsula.*
Looking eastward toward beach on W coast of island. Prior to 8 March 1938.

Sibago Island lies 7½ miles eastward of Coco Island and about the same distance northeastward from Matanal Point, the eastern extremity of Basilan Island. It is 1½ miles long in a north-northwest direction, ¾ mile wide, and covered with vegetation. Two distinct and prominent hills, the northern one of which is the higher, rise in the interior of the island. The shores are low except in the middle of the northeast side. Stretching off from the southeast side for more than ½ mile is a bank of clean sand having a depth of 7½ fathoms at the outer end and then falling off rapidly to 100 fathoms and more ¾ mile from the island.

Lanhil Island, lying 1½ miles northwestward of Sibago, is 1¼ miles long in an east-northeast direction, 560 feet in height at the southern part, and covered with trees. The shore is low, and the reef which surrounds the island dries out for a distance of ¼ mile eastward, forming a small bay on the south. Sibago and Lanhil Islands, seen from certain directions, appear as a saddle-shaped island. The channel between Lanhil and Sibago Islands is clear and has a depth of 16 fathoms, sand and mud bottom.

From the northern entrance to Masinloc Anchorage the coast trends in a general north-northeasterly direction for 25 miles to Taguite Point. This very irregular stretch of the coast is indented by numerous small bays, most of which are foul and of no importance to navigation. It is intersected by several small unnavigable streams. A number of small, unimportant native villages are scattered along the shore. The coast is fringed in

places by coral reefs and faced by many small islands, which are generally clear on their seaward sides.

Malasugat Point, about 5 miles north-northeast from the northern entrance to Masinloc Anchorage, is low, wooded, and fringed by a narrow reef. Malasugat Bay, a slight indentation in the coast southwestward from a point of the same name, is nearly blocked by reefs.

The Panubigan Islands are a group of some 20 small islands and rocks lying off the coast between Malasugat Point and Lawigan Point, 5¾ miles northward. None of them are over 2 miles from shore. They are generally high and well wooded. The mainland behind these islands is covered with cogon grass, with scattered areas of cultivated land as far north as the village of Buena Vista, about halfway between the northern end of the islands and Taguite Bay.

From Lawigan Point, the coast trends northward to Bluff Point, and is indented by a number of small, unimportant bays which are mostly blocked by coral.

Mount Taguite, a prominent peak rising abruptly from sea level to a height of 1,400 feet, is situated about ½ mile from the coast and 1 mile 326° true from Bluff Point. It is entirely wooded and has steep, symmetrical slopes, with a smoothly rounded dome-shaped top. The mountain is the highest elevation near the coast in this vicinity.

From Bluff Point, the coast trends northward for 3½ miles and then southeastward in a very irregular line for over 2 miles, forming Taguite Bay. Taguite Bay is 3 miles wide between Bluff and Taguite Points, and about 3 miles long. The bay is shoal and of no value to navigation. Taguite Island, lying near the middle of the bay, is a wooded island about ½ mile in diameter, rising to a height of 217 feet.

(3) Anchorages.

For anchorages off the port of Zamboanga, see Chapter VI.

Tictauan Channel affords good anchorage in 10 to 14 fathoms, although it is an area of very strong currents.

Good anchorage may be found anywhere in Masinloc Strait in from 6 to 12 fathoms, mud bottom, with good holding ground. This anchorage is completely sheltered from wind and sea, and vessels take refuge here in the southwest monsoon.

Sheltered anchorage may be found among the Panubigan Islands. The anchorage formed by Kabungan, Buguias, and Lambang Islands has been used and is recommended. The entrance northward of Buguias Island is the best, as it is easily navigated and apparently free of dangers, and leads to anchorage in 7 to 9 fathoms.

(4) Dangers to navigation.

Santa Cruz Bank is a coral bank, the northern edge of which is 1½ miles distant from the coast of Mindanao. It extends 8 miles in a direction parallel to the coast and has a general width of 2 miles. There is a channel of not less than 8 fathoms crossing the middle of the bank diagonally in a northwest and southeast direction. The shallowest water, ranging from ½ to 4 fathoms, is distributed in patches along the outline of the bank. There is a dangerous spot, covered by 3 feet of water, 2 miles westward of Great Santa Cruz Island with Little Santa Cruz Light bearing 53° true.

President Shoal, with depths of from 2½ to 4¾ fathoms, extends from ¾ mile 218° true to 1 mile 142° true from the eastern end of Great Santa Cruz Island. Two shoal parts of 2¼ and 2½ fathoms lie, respectively, 8° true and 40° true ¾ mile from the eastern end of Great Santa Cruz Island. There is also a detached patch of 4¾ fathoms lying 111° true, distant 1½ miles from the same point.

Luzon Reef lies on the bearings Zamboanga Light 1° true and the north end of Lanhil Island 93° true. The area of least depth, 3½ fathoms, is very small and is surrounded by deep water, but the area of less than 10 fathoms extends about 4 miles east and west.

A sand and coral shoal having a depth of 16½ feet within the 5-fathom curve exists in the southwesterly approach to Tictauan Channel. Tictauan Shoal, about 400 yards long in a north-northwest direction, and 150 yards wide within the 5-

FIGURE IV - 100. *Zamboanga Peninsula, SE coast.*
Coast of Moro barrio of village of Taluksangay, looking SW. 1941.

fathom curve, occupies the middle of Tictauan Channel. It is composed of sand and coral, covered by a least depth of 3 fathoms, and is generally marked by rip tides. The wider and better channel lies northwest of this shoal.

Stretching out northeastward for a distance of nearly 2 miles from the eastern end of Tictauan Island, there are a number of shoal patches with depths of 2¼ to 3 fathoms. The channel between these shoals and Pangapuyan Island, while practicable, is not recommended for a stranger.

In the northern entrance to Masinloc Anchorage there are a number of shoals which divide it into 2 channels, both of which are about ½ mile wide. The western channel has a least depth of 5½ fathoms and the eastern one a least depth of 6½ fathoms. Local knowledge is necessary for their navigation. A small shoal covered by a least depth of ½ fathom lies ¾ mile northward from the north coast of Sacol Island.

Angosto Shoal, covered by a least depth of 1½ fathoms, is a shoal of coral and sand ⅓ mile in extent, lying about 4 miles 75° true from Tulnalutan Island.

Roldan Rock is a small rock, covered by a least depth of ¾ fathoms and surrounded by deep water, lying 2⅛ miles from the northern part of Sacol Island.

A very small shoal of black and white sand, covered by a least depth of 4¾ fathoms, exists about 1½ miles 101° true from the south tangent of Sinonog Island.

Great Sand Bank, composed of fine sand, and covered with depths of from ½ to 9 fathoms, extends 4¾ miles westward from Malanipa Island. The bank is about ½ mile wide near the island, but tapers to its western end, where a depth of 3¾ fathoms is found about 1¼ miles from the tip of the bank.

In the entrance to Sibuguey Bay, about midway between Sacol Island and Olutanga Island, 8 distinct detached shoals have been located. The shoals are all composed of coral limestone and white coral sand, and are surrounded by deep water. In a favorable light they can usually be sighted by the color of the water. However, this criterion must not be relied upon, for often the coral heads on which the least water is found are dark, and do not show up as well as the sand in deeper water.

The positions of these dangers have been fixed by the bearings of the nearest prominent landmarks that can be readily identified from the shoals, as described in the Philippine Islands Pilot, Part II, 1940, p. 234.

The coast between Masinloc Anchorage and Taguite Point can be safely navigated by keeping 1 mile outside of the island and outlying points.

There is a small, dangerous 1-fathom patch, lying about 1½ miles southward from Malasugat Point and about 1 mile from shore.

Off the Panubigan Islands a small shoal, covered by a least depth of 4¾ fathoms, and surrounded by deep water, lies on the bearings Mount Taguite 284° true and Sacol Hill 208° true.

(5) Landing beaches.

(*a*) *Taluksangay beach.* (PLAN 25, Section D(j)) Reliability POOR. A small sand beach, less than 1 mile long and from 20 to 30 feet wide at high tide, is located at the village of Taluksangay at 6° 57′ N, 122° 11′ E. The village is located along the western shore of Masinloc Channel in the shelter of Sacol Island. The village may be recognized by the houses built out over the water.

The approach to the village is by way of the channel between the mainland and Sacol Island. An interruption in the fringing coral reef occurs at the village which is located at the mouth of a stream (PLAN 27). Bottom materials are coral mud and sand. The village is relatively sheltered from winds and waves although swell from the southwest may penetrate along the Masinloc Channel. The mean tidal range is about 2.5 feet and the flood tidal current sweeps southwestward along the channel.

The beach is composed of sand, mainly of coral origin. It has a flat slope and is firm. In part the beach is fronted by numerous houses built over the water, but the eastern part of the beach is free of these obstructions. The village is scattered along the beach, and coconut palms line the beach area (FIGURE IV - 100). On both sides of the beach are extensive mangrove swamps.

The terrain here is part of a flat coastal plain. A paved branch road runs inland from the village to join the main coastal highway several miles inland. Another small, unnamed village, 2½ miles southwest of Taluksangay, also offers a site for limited landings.

(*b*) *Bolong beach.* (PLAN 25, Section D(k); FIGURES IV - 101 and IV - 102) Reliability FAIR. At the village of Bolong, along the eastern shore of the Zamboanga Peninsula, is a sand beach about 1 mile long and 40 to 50 feet wide along most of its extent at low water. The center of the beach is at 7° 05′ 40″ N, 122° 14′ 10″ E. A landmark for the beach is Malasugat Point, low and wooded, which lies near the southern limit of the beach.

The approach to the shore is clear except for Roldan Rock, which lies about 6 miles southeast of the beach, and Pitas Island, located about 1 mile northeast of the beach. Nearshore slopes are generally moderate and the bottom materials are mainly coral mud and sand. A fringing coral reef occurs at Malasugat Point. The beach is partly exposed to winds and waves from the northeast and is generally open to the southeast. The mean tidal range is about 3 feet, and the flood tidal current moves southward along the coast.

The beach is interrupted by the mouth of the Bolong River. It is composed of coral sand and debris (FIGURE IV - 101) and is firm. The slope of the beach is about 1 on 15 to 1 on 25, but locally it may steepen into a low ridge several feet high above the high water line.

The beach is backed by coconut palms, and part of it fronts the village of Bolong. A spur of the coastal highway runs to the village from the road which is a short distance inland. The main highway affords connections both north and south along the coast. Exit from the beach is convenient, and it is possible to drive along much of the beach itself (FIGURE IV - 102).

(*c*) *Buena Vista beach.* (PLAN 25, Section D(l)) Reliability POOR. A sand beach reported to be about 1 mile long exists at Buena Vista along the eastern shore of Zamboanga Peninsula. Its center is located at 7° 14′ 40″ N, 122° 16′ 40″ E. No conspicuous landmarks mark this part of the coast, except Mount Taguite, located about 4 miles northward.

The approach to the shore is clear and the bottom slopes are moderate to the fringing coral reefs which lines the shore. The bottom materials are coral sand and mud. The beach is exposed to winds and waves from the eastern quadrant. The average tidal range is about 3 feet and the flood tidal current moves southward along the shore.

The beach is composed of coral sand with a slope ranging from 1 on 10 to 1 on 15. The beach is generally firm and is

FIGURE IV - 101. *Zamboanga Peninsula, SE coast.*
Bolong beach, of coral sand and debris, backed by coconut palms. Looking SW.

FIGURE IV - 102. *Zamboanga Peninsula, SE coast.*
Bolong beach, looking SW. December 1931.

without interruptions or structures as far as known. Surf may be heavy during northeast winds and occurs in a relatively wide belt.

The village of Buena Vista is located along the beach among coconut palms. A trail lies a short distance inland from the village and connects with a secondary coastal road which runs southward along the coastal plain to join the main coastal road at Bolong.

L. Zamboanga Area: Taguite Bay to Taynabo Point.
(PLAN 25; U.S.C. and G.S. charts 4605 and 4651)

(1) Offshore zone.

The 10-fathom line lies ⅛ to 2½ miles offshore. Within 5 miles of the coast the depths do not exceed 40 fathoms.

Sand and coral border the shore between the bays, but the prevailing bottom sediment within the bays is alluvial mud with coral patches. The sea floor off the coast consists primarily of coral limestone, coralline debris, and sand as far north as Buluan Island. Beyond this point muds predominate throughout the head of Sibuguey Bay.

(2) Coastal topography.

Vitali Island, which lies between Taguite Bay and Tungauan Bay, is separated from the mainland by a shallow slough, which has not been examined. There is a large cattle ranch on the island. Between Taguite Point and Vitali Point the coast is heavily wooded from the shore line or the inner edge of the mangroves, as far as can be seen.

Vitali Point, 7° 23′ N, 122° 23′ E, is located about 6½ miles northeastward from Taguite Point. A prominent house stands on the point. Near Vitali Point the low foothills are covered with rank grass. Behind the foothills, the low mountains are heavily wooded to their summits. This section of the coast is fringed by a narrow coral reef. About 1½ mile southwestward from Vitali Point there is a small, low, wooded island, lying on the shore reef close to the coast.

The Tigbauan Islands are a group of 5 islets and 1 rock lying eastward and southeastward from Vitali Point. They include Tigburacao, the Gatusan Islands, White Rock, Bacungan, and Lapinigan Islands.

Tigburacao Island, the southeasternmost of the group, is a low, flat, heavily wooded island, 300 yards long east—west and 150 yards wide, lying about 3⅜ miles 134° true, from Vitali Point. It is fringed by a narrow reef, which is widest on the west. Southeastward about 100 yards from this island, there are 2 large pinnacle rocks, the higher of which rises to a height of 40 feet. These rocks are very prominent and are visible from a considerable distance. When seen from the southwest they appear as one.

White Rock, over ½ mile 248° true from Tigburacao Island, is bare at all stages of the tide. It stands on a small coral reef which is surrounded by deep water.

The 2 Gatusan Islands lie about 2 miles 151° true from Vitali Point. Both are small, about 300 yards long north—south and less than half that in width. They are wooded and fringed with rocks. The northern island is less than 50 feet high, but the southern rises to a height of 117 feet.

Bacungan Island, the largest of the group, lies 2 miles eastward from Vitali Point. It is about 450 yards long northeast—southwest, and nearly 300 yards wide. The shores are fairly bold and the land rises sharply from sea level to a height of 211 feet.

Lapinigan Island lies a little over ½ mile 60° true from Vitali Point. It is nearly round, about 200 yards in diameter, heavily wooded and rises to a height of 192 feet. On the south and east sides, rocks, bare at low water, extend to a distance of 50 to 60 yards. The channel between Vitali Point and this island has a least depth of 2¾ fathoms. The island, seen from the southward, resembles a cone, with a steep slope on the eastern side and a gradual rise on the western.

The coast from Vitali Point trends sharply westward, then northward and eastward to Linguisan Point, forming Tungauan Bay. Near the coast are numerous forested hills with heights of 100 to 200 feet, separated by deep, winding valleys. Inland the land rises in a series of hills to the mountains well back in the interior.

Tungauan Bay is a nearly semicircular indentation between Vitali and Linguisan Points. It is about 7 miles wide at the entrance and extends some 3 miles southeastward. The depths decrease gradually toward the western shore, where there are extensive mud flats. Nearly the whole bay has a mud bottom, but in a few places, where the depth is over 10 fathoms, the bottom is sandy.

Cone Hill is a small, conical hill, 750 feet in elevation, located 2¾ miles west of the mouth of the Tigbao River. Its entire seaward side is covered with cogon grass and stands out sharply against the surrounding background of dark woods. The hill serves as an excellent landmark in approaching Tungauan Bay from the eastward.

Sharp Peak, elevation 2,471 feet, is the highest peak on the ridge westward from Tungauan Bay. There is another peak southward from it at a lower elevation. No confusion need arise as to which is the peak in question unless the ridge is in the clouds, in which case only the lower peak will be visible.

Cabog and Camugan, 2 small wooded islands slightly over 50 feet high, and a very small wooded islet 20 feet high, lie on the same reef, about 1½ miles northwestward from Vitali Point.

Tigbucay Bay is a small bay, extending about 1 mile in a northeast direction from the northern part of Tungauan Bay. The southern part is apparently deep and clear, but the northern part is shoal. It is of comparatively little importance, since it lies immediately westward from the fine harbor of Port Banga.

Bangaan Island (7° 30′ N, 122° 25′ E) lies between Tigbucay and Linguisan Points, the western and eastern entrance points to Port Banga. It is about ⅜ mile long, in a northeast—southwest direction, and has a greatest width of ¼ mile. The island is sparsely wooded on the slopes, grassy on the upland, and rises to a height of 160 feet. Its shores are clean and steep-to on the northern side, but foul on the southeastern and southwestern sides. From a point 90 yards off its northeast end a line of rocks parallels the southeast shore to a little below the southwest extremity of the island. From the southwest point a rocky ledge extends about ⅜ mile in a southwest direction.

Port Banga (U.S.C. and G.S. chart 4651), opening from the northern part of Tungauan Bay, is 2 miles wide at the entrance and extends about 4 miles northeastward. Bangaan Island divides the entrance into 2 good channels. The port is navigable for a distance of 2 miles for all classes of vessels, and nearly to its head for very small vessels. Lampinigan Island is a small, heavily wooded islet, lying off the northwest side of the port,

1½ miles above Bangaan Island and about ¼ mile from the shore. Along the northwest shore of the port, northwestward of a line running 45° true and 225° true from the eastern side of Lapinigan Island, there is foul ground with bare coral patches northeastward from the island, and coral extending to a short distance off the points southwestward from it.

Linguisan Point, the eastern entrance point to Port Banga, is low and wooded, with a small native settlement on its inner side. Surrounding the point, and eastward from it, along the south side of the peninsula which forms the eastern side of the port, is a coral shelf, over ¼ mile wide, partly bare at low water. The extreme eastern part of this shelf extends a little farther out and is marked by rocks showing above high water.

From Linguisan Point the coast trends eastward for 1 mile, then northeastward for 5¾ miles to Bagolibud Point, forming a peninsula between Port Banga and Sibuguey Bay. The shore line is well defined by numerous cliffed points, with sandy beaches in the indentations between them. The southern part of the peninsula is covered with cogon grass and a few scattered trees. On the northern part are low, wooded hills, the northeasternmost of which rises to 183 feet and forms the summit of Bagolibud Point. This stretch of coast is fringed by a narrow strip of coral.

Panabulan Islet, situated 3 miles south-southwestward from Bagolibud Point, is very small and is surrounded by a reef which connects it with the mainland, about 300 yards distant.

Loclabuan Bay is a small indentation about ½ mile in diameter, located 1½ miles southwestward from Bagolibud Point. On the northern side of this bay there is a prominent, heavily wooded hill, which rises to a height of 244 feet and is the highest elevation in this vicinity.

Bagolibud Point, at the southern entrance to Busan Bay, is a heavily wooded, narrow neck of land prolonged in a northeast direction. The north side is fringed by a coral reef and lined with mangroves. Foul ground extends to a distance of ¼ mile eastward from the point. Nearly ⅛ mile northward from the point are the Tatal Rocks, a cluster of rocks 10 to 13 feet high, which are connected with the land by a reef bare at low water. These rocks are very conspicuous when seen from seaward.

Padugan Islet lies about 300 yards from shore on the outer edge of the shore reef, which bares at low water on the north side of Bagolibud Point. It is 20 feet high and very small.

From Bagolibud Point the coast trends westward for 4½ miles, then turns sharply and trends northeastward for 9 miles to Laboyoan Point, forming Busan Bay.

Lalim Point, about 1¼ miles westward from Padugan Islet, is fringed by coral reefs which extend ¼ mile northward of it. The southwest corner of Busan Bay is entirely closed by coral reefs awash at low water. Saduc Islet is merely a clump of mangroves growing on the reef in the southwest part of the bay, about 300 yards from shore.

Diligan Island, lying about 1¼ miles northwestward from Bagolibud Point, is low, heavily wooded, and fringed by a narrow, steep-to coral reef. It is about ¼ mile long east—west, and ⅛ mile wide. The island may be rounded in safety at a distance of ¼ mile.

Calug Point, about 2 miles northward from Diligan Island, is a low narrow point extending in an easterly direction. A coral reef, all but the outer extremity of which is awash at low water, projects about ½ mile southward from the point. Northward from the point the shore is fringed by coral, except in the bight on the north side of the point, and in the bight westward from Buluan Island.

Among the natural landmarks in the immediate interior, Tupilac Hill is the most conspicuous, lying 3¼ miles west-southwestward from Laboyoan Point, and 265° true from the summit of Buluan Island. It is a cone-shaped, grassy hill, rising to a height of 517 feet. Because of its wooded background, the hill can be seen from a considerable distance seaward.

Three grass-covered hills of lesser importance are situated southwestward from Tupilac and numerous low knolls with grassy slopes surround the southwest shore of Busan Bay. These hills are separated from the higher, more prominent, distant mountains of the interior by a river valley leading inland in a westerly direction from Calug Point. A similar valley extends from the southern shore of Busan Bay to Port Banga.

Laboyoan Point, forming the northeastern limit of Busan Bay, is a low mangrove point between the mouths of the Gango and Looc Rivers, both of which are small and unimportant. From the end of the point mangroves continue about 1 mile in a northwest direction. It is surrounded by coral reefs more than ½ mile wide. Laboyoan Point is 7 miles 10° true from Bagolibud Point at the south entrance to Busan Bay.

Mount Silingin, located about 5 miles northwestward from Laboyoan Point, is a conspicuous landmark from all parts of Sibuguey Bay. It has 3 prominent peaks, and a lesser one rising from its northern shoulder. Quipit Peak, 2,950 feet, the central and highest, and Matanog Peak, 2,431 feet, have been accurately located and are readily identified.

Buluan Island, the largest and most prominent island in the northern part of Sibuguey Bay, is about ½ mile long in a northwest—southeast direction and rises in the southeastern part to a sharp, heavily wooded peak, 324 feet high. It is 6⅜ miles 20° true from Bagolibud Point, and about ⅞ mile southwestward from Laboyoan Point, from which it is separated by a navigable channel ¼ mile wide and from 8 to 10 fathoms deep in the middle. The eastern, southern, and southwestern sides of the island are fringed with coral, bare at low water. One-eighth mile southeastward from the island are rocks awash at high water. Deep water is found close to the reefs on all sides of the island except the southeastern, which should be given a berth of at least ½ mile.

From Laboyoan Point the coast trends northeastward with a curve northwestward to Madiaop Point. The Buluan River discharges about 1⅓ miles north-northeast from Laboyoan Point, with the village of Buluan on the south side of its mouth. There is a large coconut plantation and cattle ranch at Buluan, and a wharf where small vessels can run alongside. The land rises gradually from the beach at Buluan, and becomes very rough in the interior, with many steep hills and gorges.

The village of Caparan lies on a low islet in the midst of mangroves about 3 miles, 31° true, from Laboyoan Point. A white sand beach outlines the south side of this islet.

Madiaop Point projects in a southeast direction and is fringed by a narrow belt of mangroves protected by numerous rocks awash at low water. Low, irregular, grass-covered hills extend from here to Saro Point.

Saro Point, situated 1½ miles east-northeastward from Madiaop Point, is outlined by low cliffs. Bacalan Point, about 1½ miles east-northeastward from Saro Point, extends about ½ mile in a southeasterly direction. The southern extremity of Bacalan Point is composed of low cliffs while a gravel beach

outlines the eastern part. The point is slightly over 10 feet high and is covered with a thick growth of light timber and brushwood. It is in reality an island, connected with the mainland by an extensive mangrove swamp.

From Bacalan Point to Taynabo Point, distant 3¼ miles bearing 83° true, the shore recedes northward for about 1 mile, forming a large bay. The upper half of this bay is composed of mud flats, bare at low water. The head is lined with mangroves through which several small streams flow.

Coba Islet is a very small wooded island, 30 feet high, about 400 yards from the shore at the head of the bay. It is an islet at high water only, being surrounded by mud flats at low tide. The southern side consists of cliffs about 20 feet high, which give the islet a rugged appearance when seen from the south.

Taynabo Point, 7° 46′ N, 122° 40′ E, is the most prominent point at the head of Sibuguey Bay. Cliffs about 15 feet high outline the southern and eastern extremities of the point, and are connected by a curved sandy beach along the southeastern side. The southern part is heavily wooded, but the eastern portion, rising to a height of 165 feet, is covered with grass and brush. The point is connected with the mainland by a narrow belt of mangroves similar to that at Bacalan Point. There is a small native settlement on Taynabo Point.

(3) Anchorages.

There is good anchorage in Tungauan Bay in about 10 fathoms, mud bottom, anywhere on a line northward from Basan Reef.

Port Banga (U.S.C. and G.S. chart 4651) affords good anchorage, perfectly protected from all winds, for vessels of any size.

Anchorage with good holding ground may be found anywhere in Busan Bay. Between the eastern limits of the reefs at the southwest corner of Busan Bay and Lalim Point there is good anchorage in 6 to 7 fathoms, muddy bottom.

(4) Dangers to navigation.

A rock awash, surrounded by deep water, lies 160° true, distant ⅜ mile from Vitali Point.

About ⅜ mile 236° true from Bacungan Island, there is a rock awash. The channel between the island and the rock is deep and clear.

There is a small shoal covered by a least depth of 2¼ fathoms lying nearly ¾ mile 92° true from Lapinigan Island.

Basan Reef, a dangerous, detached, coral shoal nearly ½ mile wide, lies 2 miles 348° true from Vitali Point. This reef, part of which bares at half tide, is the only danger on the southern side of the entrance to Tungauan Bay. On the 2 highest parts of this reef, banks of white sand have formed which are visible from a considerable distance except at extremely high water. The north and east sides of the reef are steep-to and may be approached with safety, but the south and west sides are foul. The water deepens rapidly east and south of Basan Reef.

From a point 90 yards off the northeastern end of Bangaan Island a chain of rocks continues along its southeastern shore to a little below the southwest point of the island, from which a rocky ledge extends out ⅜ mile in a southwest direction. The southwest point of the island should be given a good berth, as the water shoals rapidly, and at high water the above-mentioned rocks are not visible.

On the southeast side of Port Banga there is a small, detached, coral patch, covered by a least depth of 3 feet at low water. It is about ½ mile 155° true from Lampinigan Island, and about ¼ mile from shore. Otherwise, the southeastern shore of the port is clear nearly to the beach, except around Linguisan Point.

Small shoal patches of 4¾ fathoms and 4 fathoms exist 670 and 875 yards, respectively, from Linguisan Point, in a line with the point and the north side of Bangaan Island.

A small, dangerous, detached reef, surrounded by deep water, lies 1 mile southeastward from the southeastern point of the peninsula between Port Banga and Sibuguey Bay. From its southern edge the northeast point of Bangaan Island bears 283° true, distant 2⅜ miles. The reef is composed of numerous coral heads, some of which bare at extreme low water.

There are no detached dangers between Linguisan and Bagolibud Points, with the exception of a small shoal, covered by a least depth of ½ fathom, which lies about 1¼ miles 187° true from Bagolibud Point, off the entrance to Loclabuan Bay.

One-eighth mile southeastward from Buluan Island are rocks awash at high water. Southward from the eastern edge of the reef which extends southeastward from Laboyoan Point, there is a detached shoal covered by a least depth of 3¼ fathoms. The eastern edge of the shoal is about ⅜ mile westward from Buluan Island.

(5) Landing beaches.

(a) Bagolibud Point beaches. (PLAN 25, Section D(m)) Reliability POOR. Between Linguisan Point and Bagolibud Point, a distance of about 7 miles, the coast forms a rocky promontory, and along the northeastern half of this stretch are a number of small headlands separating short sandy beaches. The center of the beach area lies at about 7° 33′ 40″ N, 122° 29′ 30″ E. The exact locations of these small beaches are not given, but a landmark for the area is Bagolibud Point, which is a heavily wooded neck of land extending northeastward.

The approach to this area is generally clear except for a shoal at the entrance to Loclabuan Bay and the Tatal Rocks, located a short distance north from Bagolibud Point. The bottom slopes within the 30-foot depth are generally steep at the headlands and moderate within the small bays and coves. A narrow, fringing, coral reef lines the shore. The bottom material is mainly coral sand and mud. The area as a whole is exposed to winds and waves from the east, with some shelter provided by the small headlands. The average tidal range is about 3 feet and the tidal current moves southwestward on flood.

The beaches are generally short, narrow, and firm, with steep slopes. They are composed mainly of coral sand and debris. Most of the beaches are terminated by headlands at both ends.

So far as is known, the only trail in the vicinity leads inland from the head of Loclabuan Bay. The peninsula is hilly and densely wooded.

(b) Buluan beach. (PLAN 25, Section D(n)) Reliability POOR. An interrupted sandy beach extends northward from the settlement of Buluan for a distance of at least 1 mile. The center of the beach is located at 7° 43′ 20″ N, 122° 31′ 40″ E. The approach to the beach is clear except for Buluan Island, which lies about 2 miles in a southeasterly direction from the beach.

Within the 30-foot depth the bottom slope is generally moderate to the fringing coral reef which fronts the shore. The bottom materials are coral sand and mud. The area is partly sheltered from the northeast, but is exposed to the southeastern quadrant. The mean range of the tide is about 3 feet and the flood tidal current moves southwestward.

The beach is composed of coral sand and debris, and is interrupted by the mouth of a river just north of the village of Buluan. This river mouth widens near the shore and may locally have mud flats in front of it. The best parts of the beach apparently lie before the village and north of the river. The beach is generally firm except near the river mouth; the slope is moderate to steep. The beach is believed to be relatively narrow at high tide. A private pier is reported to be located at Buluan.

The terrain inland of the beach rises in gentle slopes to a hilly interior. Part of the lowland is swampy. No information is available regarding trails from the village.

(*c*) *Bacalan Point beach.* (PLAN 25, Section D(o)) Reliability POOR. A short gravel beach, less than 2,000 feet long and relatively narrow, is located along the eastern side of Bacalan Point, which is located at about 7° 45′ 40″ N, 122° 37′ E. Bacalan Point itself is about 10 feet high and covered with thick timber and brushwood.

The approach to the point is clear and the bottom slope within the 30-foot depth is gentle. Mud flats extend some distance outward from shore northeast of the point. The bottom material is sand and mud. The beach is exposed mainly to southeast winds and waves. The average tidal range is about 3 feet and the flood tidal current moves westward past the point.

The beach is composed of non-coral material, mainly gravel. It is narrow, steep, and firm. No structures occur on it, and surf breaks in a moderately wide belt off the beach.

Bacalan Point is actually an island connected to the mainland by a mangrove swamp. Mangrove also extends northeastward from the point, and there are no villages in the vicinity. Exit from the beach is rendered difficult by the swampy terrain inland.

M. Davao Gulf Area: Matil Point to Tinaca Point.

(PLANS 28 and 29; U.S.C. and G.S. charts 4607, 4608, and 4653).

(1) Offshore zone.

The 10-fathom line, lying ⅛ to ¾ of a mile offshore, is farthest from the coast at the head of Sarangani Bay and southward from Lefa Point. The zone of less than 100 fathoms, ranging from ⅛ of a mile to 3 miles in width, is also broadest in the same areas. Except at the head of Sarangani Bay, the sea bottom drops off very abruptly beyond the 100-fathom curve. Within a zone 5 miles from the coast a maximum depth of over 1,250 fathoms occurs southwestward from Hagdan Point.

The bottom sediments consist of a belt of sand of highly variable width next to the shore, with numerous patches of coral limestone, coralline debris, and mud. This belt is interrupted by deltaic deposits of mud and silt surrounding the river mouths. It appears to be widest at the head of Sarangani Bay. The sand zone is succeeded offshore by muds spotted with many areas of reef limestone, coral debris, and sand.

Tide rips and strong tidal currents are present along this entire stretch of coast, including Sarangani Bay. They are particularly strong between Matil and Tampuan Points, off Labu Point in Sarangani Bay, off Sagby Point, and north of Hagdan Point.

(2) Coastal topography.

Between Matil Point and Tampuan Point, at the entrance to Sarangani Bay, the coast is bordered by narrow strips of sand and gravel beach, separated by rocky points and stretches. There are scattered coconut and hemp plantations along the coastal plain, which attains a maximum width of 1 mile. Behind the coastal plain rough, heavily forested mountains rise abruptly to elevations of over 2,000 feet.

Matil Point, composed of coralline limestone and sand, is low and flat. The tree line lies about 100 yards back of the point.

At Taliak Point the hills behind the shore are lower and more rounded than the mountains to the westward.

Eastward from Kamanga Point there is a prominent cliff 50 feet high.

Tampuan Point is marked by vertical cliffs 35 feet high. The cliffs here and at Kamanga Point form good landmarks for coasting vessels.

Sarangani Bay is over 6 miles wide between Tampuan and Sumbang Points and extends 16 miles northeastward. Near the entrance the land rises steeply from the shore.

Along the western coast of the bay as far north as the village of Kalumpang there are steep banks or ledges of coralline limestone behind the beaches in many localities. The edge of the shore reef here is usually marked by coral boulders which are exposed at ¾ tide. Only the lower flanks of the hills on the western side of the bay are wooded; the upper slopes are covered with cogon grass.

At the head of the bay the land is flat, rising gradually through rolling, cogon-covered country to the higher hills and mountains in the interior. This is a good grazing and farming area with numerous ranches and plantations.

On the eastern side of the bay the coastal plain is locally fringed by mangrove swamps, and the hills behind the shore line are heavily forested.

Mount Matutum, 30 miles northward of Tampuan Point, rises to a height of 7,524 feet, and forms a prominent landmark when free from clouds.

Makar (FIGURE IV - 103), in the northwest angle of the bay, consists of only a few houses. Beginning about 1 mile south of Makar and continuing to a point about 2 miles east of the village of Dadiañgas, the coast is fringed by a sandy beach. Open grassland extends up the Koronadal Valley behind Makar. A coastal highway between Makar and Glan, on the southeastern side of Sarangani Bay, was under construction and partially graded before the outbreak of the war.

There is a large cattle ranch and much open grassland near the village of Boayan, on the west side of the mouth of the Boayan River, at the head of the bay. The river behind the bar is reported to be deep. A sandy beach extends along the shore in front of the town.

A prominent white cliff rises from the water's edge just northeastward of Tango Point. A sandy beach fringes the shore from the south side of Tango Point to the mouth of the Big Glan River at the head of Canalasan Cove.

Canalasan Cove (U.S.C. and G.S. chart 4653) lies eastward of Sumbang Point. The town of Glan, the largest settlement on Sarangani Bay, is located at the head of the cove. The white cliff northeastward from Tango Point and the rock and white cliff of Sumbang Point are good landmarks for this portion of the coast.

Sumbang Point is marked by a white, bare cliff, 50 feet high. Southward of the point, the trees grow down to the high water line. Many boulders, eroded from the cliff face, lie along the reef, which bares at about one-quarter tide.

From Sumbang Point the coast trends southeastward to

Tinaca Point, the most southerly point of Mindanao. Saddle Peak, 3,687 feet high, Dome Peak, 1,950 feet high, and the volcano on Balut Island, 2,895 feet high, are prominent landmarks for this vicinity. They show up well from a great distance, first appearing to be islands lying off the mainland. Dome Peak often is visible when the higher mountains are covered by clouds. Except in the bays between the headlands, where narrow coastal plains exist, the shore line is precipitous and only short strips of beach separate the mountains from the sea. Plantations and small settlements are located along the coastal plains and in the small stream valleys. Lefa Point is very steep and rocky, with many large boulders lying close inshore. The head of the small bight between Kapia and Lefa Points has a light sand beach.

Sagby Point is marked by a red cliff, and is the beginning of a long barrier reef which affords a protected canoe passage with a least depth of about 1½ feet of water southward to Bulyos Point.

A sandy beach lies in front of the village of Batulaki at the head of Batulaki Cove, between Tampat and Tinaca Points.

Tinaca Point, the southern extremity of Mindanao, consists of 2 headlands connected by a semicircular beach. It is clean and steep-to southward, and may be passed at a distance of 100 yards. It resembles half of a volcanic crater which has been breached by the sea. (FIGURES IV - 103 and IV - 104)

Tinaca Point Light, 5° 33′ 22″ N′ 125° 19′ 50″ E, was exhibited 140 feet above high water from a white concrete tower on Tinaca Point.

(3) Anchorages.

Owing to the great depth of water and steep bottom slopes in its various bights, Sarangani Bay affords rather poor anchorage.

Kalumpang. Good anchorage is reported to exist off this village.

Makar (FIGURE IV - 103). For anchorages off this locality see Chapter VI.

Boayan (FIGURE IV - 106). Because of the deep water close to the mud banks formed by the river, and exposure to the southerly winds, the anchorage at Boayan is very insecure. It lies about ¼ mile offshore.

Lago Cove. This cove affords anchorage in 20 fathoms, but the area is very restricted.

Malapatan. Good anchorage is reported to exist off this village, about 1⅓ miles south of Tuyan.

Sapu Bay (U.S.C. and G.S. chart 4653). This bay offers anchorage protected from southerly and southwesterly winds in 20 to 25 fathoms.

Canalasan Cove (U.S.C. and G.S. chart 4653). Though steep, this is the best anchorage in Sarangani Bay during the southwest monsoon.

Glan (U.S.C. and G.S. chart 4653). For anchorages off this town see Chapter VI.

Lefa Point to Sagby Point. Temporary anchorage may be had at many places in the bay between these points, but the water is deep and all of the localities are exposed to the southward.

Batulaki. Good anchorage for small vessels of 8-foot draught or less is reported to exist off this village.

Tinaca Point. Open coast anchorage may be taken up eastward of this point, or in the vicinity of the 6¾ fathom shoal ¼ mile southwestward of it.

(4) Dangers to navigation.

Shoals with depths of 1½ to 4 fathoms lie ¾ of a mile south of Taliak Point. They extend about 1½ miles in an east—west direction, with a 9-fathom spot 1½ miles farther westward.

Shoals with depths of 1½ to 4½ fathoms exist ½ mile off Kamanga Point.

Deep water occurs between these two groups of shoals and between the shoals off Taliak Point and the coast.

Outside the shore reef Sarangani Bay is generally free from dangers. The edge of the shore reef is usually marked by boulders exposed at ¾ tide.

A shoal with a least depth of 3¼ fathoms lies ¼ mile southeast of London Point, and a shoal with a least depth of 2¼ fathoms lies ¼ mile eastward of Labu Point. These shoals would be dangerous only to vessels coasting very close inshore.

FIGURE IV - 103. *Davao Gulf area, Tinaca Point.*
Looking NE from anchorage. Prior to April 1935.

FIGURE IV - 104. *Davao Gulf area, Tinaca Point.*
W side of point. Looking NE from anchorage. Prior to April 1935.

Three shoals with depths of 2¾ and 4¾ fathoms lie in the northern half of the bay between Lefa and Sagby Points.

There is a 5½-fathom shoal 1 mile southwestward of Sagby Point, and a 7-fathom shoal 1 mile westward from the 5½-fathom spot.

A shoal under 6¾ fathoms of water lies ¼ mile southwestward of Tinaca Point.

(5) Landing beaches.

(*a*) *Makar beach.* (PLAN 28, Section E(a); FIGURES IV - 103 to IV - 105) Reliability GOOD.

1. Location and extent. At the settlement of Makar in Sarangani Bay and northeastward along the coast from it is a coral sand beach about 3 miles long. The limits of the beach area lie between the mouth of the Makar River at 6° 05′ 20″ N, 125° 09′ 10″ E, and 6° 06′ 00″ N, 125° 11′ 50″ E. The beach lies near the head of Sarangani Bay, where the west shore turns eastward, but there are no conspicuous landmarks for the beach.

2. Nearshore. The approach to the 30-foot depth is clear along this beach area (FIGURE IV - 105), but shoreward from that depth the bottom slopes relatively steeply to the fringing coral reef which lines the shore in the vicinity of Makar and at the eastern limit of the beach area. Eastward of the Siloway River mouth, the fringing reef is absent and the 30-foot depth lies a few hundred feet offshore near the river mouth, increasing to about 1,000 feet farther east. The bottom material is mainly coral sand and mud. Sarangani Bay affords some shelter from the swell which approaches during the southwest monsoon season, but swell from the south may generate relatively heavy surf along the eastern part of the beach at least. The mean range of the tide is about 4½ feet and the flood tidal current moves northward past the settlement of Makar.

FIGURE IV - 105. *Davao Gulf area, Sarangani Bay.* Chart of Makar, at NW corner of Sarangani Bay.

3. Character of beach. The beach is interrupted in the vicinity of Dumpao Point north of Makar. At the settlement itself the beach extends for about 1,000 feet southward toward the mouth of the Makar River (FIGURE IV - 106). This part of the beach is relatively narrow in front of the settlement, but widens toward the river to a maximum of about 200 feet at low tide. Northward the beach merges with the fringing coral reef which widens to nearly 1,000 feet in front of Dumpao Point. Northward of Dumpao Point the reef narrows and the beach resumes. It is interrupted by the mouth of the Siloway River about 4,000 feet northeast of Dumpao Point. The beach exposes a wide sand flat near the river mouth at low tide, but eastward of the river the beach narrows to an average width of about 75 feet at low tide. Near the eastern margin of the beach the fringing coral reef again appears, attaining a width of 1,500 feet.

The beach as a whole is composed mainly of coral sand, but it is mixed with non-coral material brought down by the Makar and Siloway Rivers. The beach is generally firm immediately in front of the settlement of Makar and eastward of the Siloway River mouth. Softer portions may be encountered near the mouth of the 2 rivers. The beach slope is generally flat near the river mouths but becomes increasingly steep toward the narrower portions of the beach, attaining maximum slopes of about 1 on 8. Surf varies in intensity along the beach, and occurs in its widest belts where the bottom gradient is least. Shore drift is northward along the southern part of the beach and eastward away from the mouth of the Siloway River. There are no structures along the beach.

4. Adjacent terrain and exits. The terrain inland of the beach is a plain, partly cultivated in the vicinity of Makar, but northeastward becoming an area largely of grass, scattered bushes, and palms. A zone of mangrove occurs along the shore between Dumpao Point and the mouth of the Siloway River, and a more extensive mangrove area extends eastward beyond the eastern limit of the beach. Locally the beach is backed by a low bank, as in the vicinity of Makar village. An airstrip is located a short distance northeast of the village (FIGURE IV - 107). A fourth-class road, indicated as being under construction, runs inland northwestward from Makar to Cotabato. A trail runs northward and eastward from the village skirting the head of the bay, joining ultimately with the western shore of Davao Gulf. This trail also connects with a shore trail which runs along the eastern shore of Sarangani Bay. Exit from the beach to the village of Makar is convenient, and it is believed that the trail along the bayhead is accessible from the part of the beach east of the mouth of the Siloway River.

(*b*) *Buayan beach.* (PLAN 28, Section E(b); FIGURE IV - 106) Reliability POOR. A sand and mud beach extends for about ¾ mile along both sides of the Buayan River in the northeastern corner of Sarangani Bay. The river lies about 6° 06′ N, 125° 14′ E. There are no conspicuous landmarks along this shore.

There are no obstructions in the offshore approach to the beach and within the 30-foot depth the bottom slopes are moderate to steep (FIGURE IV - 108). A fringing coral reef lines the western part of the beach to within about 1,500 feet of the river mouth. Mud banks lie off the river mouth with deep water close to them. The bottom materials consist mainly of mud and sand. The beach is exposed to southerly winds and swell during the summer months of the southwest monsoon. The mean tidal range is about 4.5 feet and the tidal current flows into the bay on flood.

The beach is wide and is generally composed of sand, partly of coral origin along the western part. It grades to mud near the river mouth where the beach is interrupted for a short stretch

FIGURE IV - 106. *Davao Gulf area, Sarangani Bay.*
Beach at Makar. Looking S. 1926.

by mangrove swamp. The slope of the upper part of the beach varies from about 1 on 10 along the western part to about 1 on 20 from the river mouth eastward; the lower part of the beach is flat. No structures occur along the beach. The surf is relatively heavy during the southwest monsoon. Shore drift is variable but moves generally to the east.

The beach is backed by open grassland which continues inland along the river valley to the northeast. The settlement of Buayan is located on the west shore of the river a short distance from the beach. The land in this area is generally given to cattle grazing. From Buayan trails run westward to Makar, northeastward to Davao Gulf, and southward along Sarangani Bay within ¼ to ½ mile from the shore.

(*c*) *Malapatan beach.* (PLAN 29, Section E(c)) Reliability POOR. A sand beach probably less than ½ mile long, lies along the eastern shore of Sarangani Bay in front of the village of Malapatan. The center of the beach lies near 5° 59′ N, 125° 17′ E. No conspicuous landmarks can be recognized along this stretch.

The offshore approach to this area is clear, and the bottom slopes are moderately steep to the narrow fringing coral reef which lines the beach. The bottom materials are mainly sand, grading to mud in deeper water. The beach is exposed to winds and waves from the south and southwest, especially heavy during the summer months of the southwest monsoon. The mean tidal range is of the order of 4.5 feet and the flood tidal current flows northward along the beach.

The beach is composed mainly of coral sand and debris; it is narrow and has a slope of about 1 on 10. No structures are known to occur along the beach. The intensity of the surf varies, but is greatest during the summer months. Shore drift is generally to the northward.

A level coastal plain, about a mile wide, extends inland behind the beach, with steep slopes rising behind it to elevations over 1,500 feet. The village of Malapatan lies directly behind the beach and a trail, running north and south from the village along the shores of the bay, is probably easily accessible.

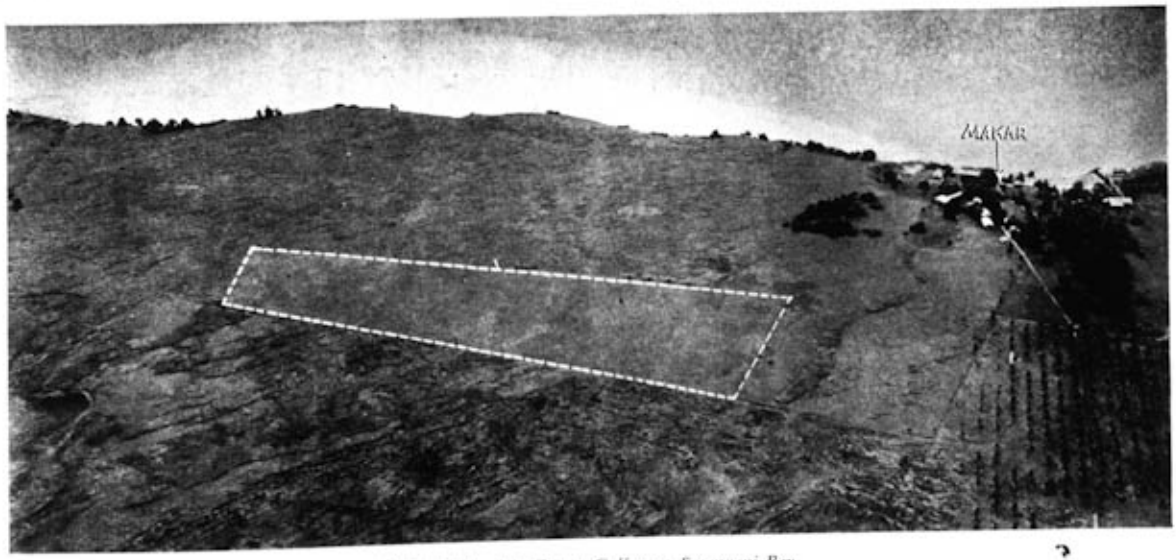

FIGURE IV - 107. *Davao Gulf area, Sarangani Bay.*
Aerial oblique of Makar village and nearby landing ground. Looking SE. Sarangani Bay in background. 17 January 1935.

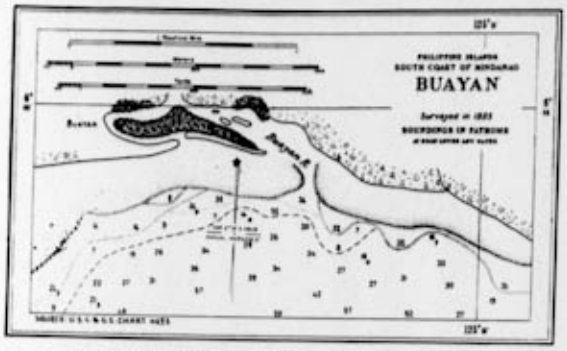

FIGURE IV - 108. *Davao Gulf area, Sarangani Bay.* Chart of Buayan, at head of Sarangani Bay.

(d) Canalasan Cove beach. (PLAN 29, Section E(d)) Reliability GOOD.

1. Location and extent. A beach about 2 miles long lies along the northern part of Canalasan Cove, between Tango Point and Sumbang Point, and a landing place occurs at Glan, within the head of the cove. The limits of the main beach lie at 5° 52′ 40″ N, 125° 13′ 30″ E, and 5° 51′ 00″ N, 125° 12′ 30″ E. Landmarks for the beach area are a white cliff northward of Tango Point, and Sumbang Point itself, a white bare cliff 50 feet high which marks the southern entrance to Canalasan Cove.

2. Nearshore. The approach to the 30-foot depth is clear between Tango and Sumbang Points; within that depth the bottom slopes are gentle to moderate along the main beach, which is fronted by tidal flats. The slopes steepen in front of the fringing coral reefs which line the shore at Tango Point and Sumbang Point. The bottom material is sand and mud, mainly of coral origin. The beach area is partly sheltered from the south, although swell from that direction curves around Sumbang Point and reaches the beach during the southwest monsoon. The average tidal range is about 4½ feet, and the flood tidal current moves northeastward into Sarangani Bay.

3. Character of the beach. The main beach, which lies just south of Tango Point, is interrupted by the mouth of the Glan Padidu River, and to the south it is terminated by an extensive area of mangrove, which lies along the landward edges of a fringing coral reef. The width of the beach itself is less than 100 feet, although at low water a mud and sand tidal flat extends in front of the beach for an average distance of 500 feet. At several points a small section of fringing coral reef projects beyond the tidal flat. The landing place at the settlement of Glan is apparently a similar sand and mud flat bordered on both sides by mangrove. The main beach north of the village has a slope of about 1 on 8 along its inner edge, but flattens to a very gentle slope toward the low water line. The inner portion of the beach is generally firm, and it is believed that the narrower portions of the tidal flat are also firm enough for crossing. No structures are located along the main beach, but there may be a small landing pier at Glan. Surf is usually light at Glan, but along the beach farther north it may at times be heavy when swell from the south is bent around Sumbang Point. Shore drift is generally northward along the main beach.

4. Adjacent terrain and exits. A narrow coastal plain lies behind the beach area from Tango Point southward. This merges with the Glan River plain which runs inland among heavily wooded hills. The plain is generally wooded, although areas of coconut palms occur behind the central portion of the main beach as well as eastward of Glan. Mangrove lines the shore between the main beach and Sumbang Point. A trail runs northward along the shore from Glan and continues immediately behind the main beach from which apparently it is readily accessible. This trail continues northward along the eastern shore of Sarangani Bay, connecting with other landing areas already described, and ultimately joining other trails which lead to the town of Makar and cross-country to the western shores of Davao Gulf. Another trail runs eastward from Glan, following the valley inland and crossing to the west shore of Davao Gulf.

(e) Calimbega River beach. (PLAN 29, Section E(e)) Reliability FAIR. A sand beach about 4 miles long extends from a mile east of Lefa Point eastward and southward to Sagby Point. The limits of the beach are 6° 46′ 30″ N, 125° 11′ 45″ E, and 6° 44′ 00″ N, 125° 13′ 45″ E. The beach is generally narrow and is interrupted by numerous small stream mouths. Lefa Point is very steep and rocky and Sagby Point, marked by a red cliff, forms a good landmark for the beach limit on the southeast. The offshore approach is obstructed by 3 shoal areas within a mile of the shore along the northern half of the beach. Within the 30-foot depth the bottom gradients are moderate to gentle. A fringing coral reef lines the shore west and southeast of the beach, but as far as is known is absent along the beach itself. The beach is most exposed during the summer months, when wind and waves approach predominantly from the south and southwest. The mean tidal range is about 4½ feet and the tidal current moves northwestward on flood.

The beach is composed mainly of sand and is generally firm with local soft areas near the stream mouths. The beach is very narrow at high tide and is backed immediately with large trees which extend almost down to the high water line. The beach has a slope of about 1 on 25, with the flattest portions near the stream mouths. No structures occur along it. Surf may be relatively heavy when swell is running and shore drift is variable. Back of the beach is a narrow coastal plain, locally swampy but covered generally with large trees and native vegetation. Small groves of coconut palms occur near the small settlements of Apla, Calimbega, and Baletan. Behind the coastal plain are moderately steep wooded hills. A trail runs northward from Apla to Glan, and another trail connects Baletan with the village of Punsad to the southeast. Northward of Lefa Point are several sand beaches fronted by a fringing coral reef and backed by moderately steep wooded slopes. A trail parallels the coast along these slopes generally about a mile inland.

(f) Bluff Point beach. (PLAN 29, Section E(f)) Reliability FAIR. A sand beach extends on both sides of Bluff Point for a total distance of 6½ miles. The limits of the beach lie at 6° 42′ 50″ N, 125° 16′ 00″ E, and 6° 37′·05″ N, 125° 18′ 00″ E. Sagby Point, marked by a red cliff, lies about 3 miles northwest of the northern limit of the beach and is the only landmark listed for the area.

The offshore approach to the beach is clear, and within the 30-foot depth and bottom slopes are moderate to gentle except along the fringing coral reef at the center and southern end, where the slopes are steeper. The beach is open to the west and is exposed to winds and waves during the southwest monsoon.

The mean tidal range is about 4½ feet and the flood tidal current moves northward.

The beach is composed of sand, with mixtures of coral sand and debris along the coral reef near the center and southern end. The beach is quite narrow above the high water line, and sections of it are backed immediately with trees and native vegetation. The beach is interrupted by a rocky ledge at Manumu Point and by several small stream mouths both to the north and south. The beach is generally firm and has a gentle slope, steeper along the inner edge of the fringing reefs. Surf may be heavy when waves are running from the southwest. Shore drift is variable but probably has a predominant trend southward. No structures are known along the beach.

Narrow coastal lowlands back the northern and part of the southern section of the beach, but behind the center and southern end of the beach are steep wooded slopes. The plain is partly cultivated with coconut palms and hemp, especially near the settlements of Punsad and Pangyan. Fresh water is not available at the stream mouths. A trail runs northwestward from Punsad to Baletan and another runs southeastward from the southern end of the beach to the village of Batulaki.

(g) *Batulaki—Tinaca Point beaches.* (PLAN 29, Section E(g); FIGURES IV - 107 to IV - 109) Reliability FAIR. A sand beach about ½ mile long lies in front of the village of Batulaki, and another lies between the 2 headlands which comprise Tinaca Point farther southeast (FIGURE IV - 109). Batulaki lies at 5° 34′ 20″ N, 125° 19′ 20″ E. The beach at Batulaki lies in a cove; the one at Tinaca Point is relatively narrow and lies at the inner edge of a fringing coral reef. A white concrete light tower is located on Tinaca Point, at an elevation of 140 feet above the sea, and serves as a landmark.

The approach to the area is clear except for a shoal area about ½ mile southwest of Tinaca Point. Within the 30-foot depth the bottom slopes are gentle in front of Batulaki, but steepen toward the fringing reef in front of the other beach. The bottom material is coral sand, locally rocky. The beaches are exposed to winds and swell from the south and southwest. The average tidal range is 4½ feet and the flood tide current moves westward past the point.

The beaches are firm, consisting mainly of coral sand; at Batulaki some non-coral material may be mixed with it. Slopes are about 1 on 20 or steeper. No structures occur along the beaches.

The beach at Tinaca Point is backed by steep wooded slopes (FIGURE IV - 109), but the one at Batulaki fronts the village which lies on a small cultivated river plain. A trail runs northwestward from the settlement of Batulaki to the landing areas in that vicinity, but no trails are indicated leading to Point Tinaca itself. Nevertheless communication with the lighthouse would necessitate a trail along the headland.

N. Davao Gulf Area: Sarangani Islands.

(PLAN 29; U.S.C. and G.S. charts 4608 and 4653)

(1) Offshore zone.

The 10-fathom line lying ⅛ to 1⅜ miles offshore, is farthest from the coasts off the east side of Balut Island. The zone of 100 fathoms or less is ¾ to 4¼ miles wide. It is narrowest at the northwest end of Sarangani Island and broadest off the

FIGURE IV - 109. *Davao Gulf area, Tinaca Point.*
Beach W of E headland of Tinaca Point.

southeast end, where a narrow tongue, most of which is under 20 to 35 fathoms of water, extends 5 miles northeastward from the main bank.

The bottom sediments surrounding the islands consist almost entirely of coral, coralline debris, and sand.

The tidal currents attain considerable velocity in the vicinity of these islands. Through Sarangani Strait the flood stream sets westward and the ebb eastward. On the east side of Sarangani Island the flood tide, deflected by the bank off the southeast side of the island, sets southward with a velocity of about 3 knots. In the channel between Sarangani and Balut Islands the flood stream sets north and the ebb stream south. Strong eddies occur on both sides of the channel near the reef line, and heavy tide rips have been noted off each entrance. The tidal current floods west-northwest and ebbs east-southeast through the channel between Olanivan and Sarangani Islands with considerable speed. Opposing currents meeting in this channel create tide rips. Heavy tide rips also occur south of Sarangani Island and west and south of Balut Island.

(2) Coastal topography.

This group consists of 2 wooded islands and a wooded sand cay, situated 7 miles from the south point of Mindanao and separated from it by Sarangani Strait.

Balut Island, the westernmost of the two islands, is the larger, higher and more cultivated, although the mountain slopes are heavily timbered to their summits. In the center Balut Volcano, which is active, attains an elevation of 2,895 feet and forms the highest point on the island. Southwest of Balut is a second volcano, and a hill 1,070 feet high rises near the southeast point of the island. On the northwest coast, about 15 yards inshore of the high water line, are 2 hot springs. This island is actually the uppermost exposed portion of a large volcano rising from the ocean floor.

The entire shore is bordered by a reef, which extends out three-tenths of a mile in places on the north and east sides of the island but is narrow on the south and west coasts.

A rock 124 feet high, known as Manamil Island, occurs off the southwest point of Balut Island. Lajan Point, the northeastern extremity of Balut Island, is low and mostly mangrove covered.

Sarangani and Balut Islands are separated by a deep channel 1½ miles wide which is reduced by reefs on both sides to a passage ¾ mile wide, navigable for any vessel.

Sarangani Island is characterized by small, heavily wooded undulating hills, the highest of which, near the north end of the island, reaches an elevation of 610 feet. The entire coast is reef bordered and on either side of the small inlet in the middle of the east coast the reef extends out $^{3}/_{10}$ of a mile. On the west coast reefs extending out ½ mile from the coast make the immediate waters very foul for 1 mile south from Port Bolay.

The entrance to Port Patuco (U.S.C. and G. S. chart 4653) may be recognized by a cliff of red clay lying a little to the northward of it. The channel is narrowed by reefs on both sides.

Tiain Point, situated 1 mile southwest from the entrance to Port Patuco, may be recognized by a prominent gray cliff. It can be approached with safety.

Port Tumanao (U.S.C. and G.S. chart 4653), located ¾ of a mile south of Tiain Point, has 25 fathoms at the entrance which diminishes to 9 fathoms in the eastern part of the port. The northern side of the entrance is bordered by a reef extending out ¼ mile. A sheer rock cliff with a near-by pebbly beach is reported to exist within the port.

Olanivan Island is a small flat cay about ¼ mile across, lying 1 mile north of the northern end of Sarangani Island. The island itself is low, although its tree tops attain a height of 113 feet. It is surrounded by a reef extending seaward ¼ mile from the east coast. Between this reef and the one fringing the north point of Sarangani Island, there is a passage ½ mile wide navigable for any vessel.

(3) Anchorages.

(a) Balut Island.

1. Lajan Point. From ½ to 1½ miles south and southeastward of this point there is good anchorage for large and small vessels in 5 to 20 fathoms, with good shelter from ordinary southwest or northeast storms.

2. South side of Balut Island. Anchorage for moderate-sized vessels may also be had on the 12-fathom spot on the south side of Balut Island, with protection from northeast wind and sea.

(b) Sarangani Island.

1. East coast. There is good anchorage in 12 to 15 fathoms, along a 2-mile stretch of the east coast, northward from the small inlet near the center of the coast. This inlet is the only shelter for small craft along the east side of the island.

2. Port Patuco. This port, on the northwest coast of the island, offers sheltered anchorage for small craft in 2 to 7 fathoms.

3. Port Tumanao. Good anchorage for small vessels may be found in 15 fathoms about ¼ mile from the head of the port.

4. Port Bolay. This port, 1½ miles southward from Port Tumanao, is small and fit only for small craft.

(4) Dangers to navigation.

In the strait between Sarangani and Balut Islands, a shoal covered by 4¾ to 5 fathoms lies to the west of mid-channel, about 1 mile, from the east coast of Balut Island.

Two detached reefs extend ½ mile out from the northeast point of Sarangani Island.

There is a detached patch, with 4½ fathoms of water over it, lying ¾ mile 0° true from Tiain Point, and westward of the entrance to Port Patuco.

(5) Landing beaches. (PLAN 29; U.S.C. and G.S. chart 4608) Reliability FAIR.

Numerous beaches lie along the shores of these 2 islands. They are in general concentrated along the northern and southern coasts. The most extensive beaches on Sarangani Island lie on the northern shore at 5° 29′ 45″ N, 125° 29′ 15″ E, and along the southeastern shore at 5° 24′ 30″ N, 125° 29′ 00″ E. On Balut Island the most extensive beach is located along the southern shore at 5° 22′ 45″ N, 125° 23′ 00″ E. These beaches are all under 1 mile in length and are very narrow above high tide.

The approach to the islands is clear with steep bottom gradients to the fringing and barrier coral reefs which almost completely surround them. The reef varies considerably in width, with a maximum of about ⅓ mile. Channels through the barrier reef afford an approach to the beach on the southern shore of Balut Island. The islands are probably subject to most heavy swell during the summer months of the southwest monsoon.

with waves approaching mainly from the south. The mean tidal range is about 4½ feet and the flood tidal current moves westward to the north and south of the islands, but to the northward in the channel between them. Tide rips occur off the northern shore of Sarangani Island and the southern shore of Balut Island.

The beaches in general are composed of coral sand and debris; they are firm and have a slope of about 1 on 8. No structures are known to exist on the beaches.

Very small areas of lowland may locally back some of the beaches, but in general they are backed by moderately steep wooded slopes. No information is available regarding trails on the islands.

O. Davao Gulf Area: Tinaca Point to Lawa.

(PLANS 28 and 29; U.S.C. and G.S. charts 4608 and 4653)

(1) Offshore zone.

The 10-fathom line lies ⅛ to 1 mile offshore, attaining its greatest distance from the coast just east of Tinaca Point. The sea bottom drops off very rapidly, reaching depths of 500 fathoms in Sarangani Strait and 1,465 fathoms within 5 miles of shore southeast of Banos Point.

In Sarangani Strait the bottom sediments consist of sand with numerous patches of gravel and coralline limestone. Between Bukid and Kibatan Points sand alone is the principal bottom sediment. From Kibatan Point northward to Calian Point the sea floor within 1 mile of shore is blanketed by sand, coral, and coralline debris, with local mud patches off the river mouths. Farther from the coast muds predominate between Kibatan and Malalan Points. Northward from Malalan Point no information on bottom sediments in the offshore zone is shown on the chart.

Tidal currents are strong along this entire stretch of coast. Tide rips occur off Kibatan Point; strong tide races and violent eddies are especially prevalent off Banos Point.

(2) Coastal topography.

Between Tinaca Point and Calian Point the hills rise directly from the sea, or from a very narrow, discontinuous coastal plain. They show many cleared areas planted to coconuts or hemp, or overgrown with cogon grass. The remainder of the hill slopes is heavily timbered up to the peaks. There are only a few stretches of sandy beach and no roads paralleling the shore. A few of the small plantations along this coast had their own docks, most of which required repair after every northeast monsoon.

Balangonan and Malavinuan Coves are located about 2 miles and 3 miles, respectively, east-northeastward from Tinaca Point. Eastward from Malavinuan Cove the reef fringing the coast extends offshore as much as ¼ mile.

Bukid Point, the most southeasterly part of the peninsula between Sarangani Bay and Davao Gulf is low and sloping, and is fringed by a narrow, discontinuous coral reef.

A small beach exists around the mouth of the Kamalian River in Kamalian Cove, a little more than ½ mile northward of Bukid Point.

From Kamalian Cove to Silacay Point, a distance of 2 miles, the coast is fringed with a very narrow reef. Fort Holland is a small settlement on the northern shore of a small cove just southwest of Silicay Point.

Silicay Point forms the northeast extremity of a blunt headland, which terminates in steep cliffs on all sides, between Fort Holland and Butulan Cove.

Butulan Cove, on which the village of Butulan is located, is semi-oval in form, ½ mile wide and ¼ mile long. Both Fort Holland and Butulan Coves are coral fringed except at their heads, where sandy beaches occur. The villages lie near the heads of the coves, on alluvial flats about ½ mile wide, and are surrounded by coconut groves.

From Butulan Cove the coast runs northeastward in a series of gently curving shallow bights and blunt points for 22 miles to Banos Point. Except for small reefs jutting out from the points and fringing the shore at intervals, this section of the coast is clear. Heavily wooded mountains rise abruptly from the sea and there is little or no coastal plain. The mountains are dissected by numerous short, steep, swift streams, most of which have small native settlements near their mouths. Landings are feasible on sand or boulder beaches all along this shore, even during moderate northeast winds, when the small projecting points offer some protection from northeast swell.

A prominent yellow cliff lies about ½ mile northward from Capisolan Point, and a smaller gray bluff occurs 1¼ miles south of Quitaly Point. Bluffs also exist in the bights immediately south and north of Calupingon Point.

A small coconut-covered coastal flat lies behind and north of the village of Caburan on the north side of the Small Caburan River, which empties into the bay between Caburan and Banos Points.

Banos Point, 5° 55′ N, 125° 40′ E, is a prominent, peaked ridge, the lowest and most southerly peak of which is 265 feet high. From here the coast runs generally north by east to Calian Point. Steep cliffs and bluffs border about half the coastline.

Small coconut-covered level areas adjoin the villages of Culaman, Taller, Luayon, Linadasan, and Lamitan. The largest of these flats surround the towns of Luayon and Lamitan.

(3) Anchorages.

Balangonan Cove, about 2 miles northeastward from Tinaca Point, affords indifferent anchorage exposed to the sea.

Malavinuan Cove, about 1 mile eastward from Balangonan Cove, affords sheltered anchorage in the northeast monsoon, in 12 to 16 fathoms.

Kamalian Cove, immediately north of Bukid Point, offers a deep and poor anchorage.

Fort Holland Cove affords good anchorage for small craft close in to the beach, but poor anchorage for larger vessels, as the depths are great almost up to the shore.

Butulan Cove offers temporary anchorage protected from swell of the sea, but is exposed to the sea that sets in from cross tides. The depth is great, with 14 fathoms almost touching the shore and 10 fathoms at the mouth of the river.

In southwest weather good anchorage may be found ½ mile offshore south of Malalan Point, in 13 fathoms.

Banos Point, 5° 55′ N, 125° 40′ E, provides good anchorage in southwest weather ½ mile offshore south of the point in 15 fathoms or on the 6¼ fathom bank nearby; and about 1 mile north of the point in 20 fathoms.

(4) Dangers to navigation.

There is a large shoal of sand and rock, covered by 3½ fathoms of water, 1½ miles eastward of Tinaca Point.

Eastward from Malavinuan Cove to Bukid Point the waters are free from dangers outside of the well-defined reef line fringing the coast; in places this reef extends as much as ¼ mile offshore.

From Bukid Point the coast is clear outside of the 10-fathom line as far north as the 6¼-fathom sand and coral shoal which lies about ½ mile southward of Banos Point.

Between Banos and Calian Points there are no dangers beyond the 10-fathom line.

Calian Point, 6° 07′ N, 125° 43′ E, the most easterly point on this section of the coast, is bold and rugged.

The dock at the village of Lapuan, about 1¾ miles northward of Calian Point, is small and in poor repair.

The electric lights at the village of Lawa are reported to be visible at night from well offshore. A conspicuous dead tree marks the beach in front of the town of Talagutong.

(5) Landing beaches.

(a) Silacay Point beaches. (PLAN 29, Section F(a); U.S.C. and G.S. chart 4608; FIGURES IV - 110 and IV - 111) Reliability FAIR. Beaches occur in 2 small bights located on both sides of Silacay Point, near the western entrance to Davao Gulf. The southern beach is at Fort Holland at 5° 36′ 50″ N, 125° 26′ 20″ E; the northern beach in Butulan Cove at 5° 37′ 40″ N, 125° 26′ 30″ E. These beaches are each about ½ mile long and 200 feet wide. No conspicuous landmarks occur along this coast.

The approach to the bights is clear. Within the 30-foot depth, the bottom slopes are moderate to the fringing coral reef which borders Silicay Point and the sides of the bights (FIGURES IV - 110 and IV - 111). The reef attains a maximum width of about 500 feet southeast of the northern beach. Bottom materials consist of sand and mud, partly of coral origin. The bights are open to the southeast so that the beaches are somewhat protected from sea swell, although they are exposed to waves and swell that set in from cross tides. The mean tidal range is about 1 feet and the tidal current moves southwestward on flood.

The beaches are composed of sand with mixtures of coral sand and debris near the ends. They are both interrupted near their centers by mouths of small streams. The beaches are firm with local softer areas near the streams; their slope is about 1 on 20 to 1 on 40. No structures are known along the beaches. Surf is relatively light. Shore drift is variable although probably generally to the northeast especially in Butulan Cove.

The beaches are backed by narrow coastal plains extending inland for about 1 mile along the stream valleys. The land is generally heavily wooded; coconut groves occur behind the beaches near the settlements of Fort Holland and Butulan. Behind the plain and in the area between the beaches, the terrain rises steeply to nearly 700 feet about ½ mile inland from Silacay Point. No information is available regarding trails in this area.

Other small beaches occur in similar surroundings along the coast northeastward to Banos Point, but detailed information on their location is lacking.

(b) Calian Point beaches. (PLAN 28, Section F(b); FIGURE IV - 112) Reliability POOR. For a total distance of about 13 miles on both sides of Calian Point are several scattered beaches in small open bights. Four of them shown on the map have average lengths between ½ and 1 mile. The beaches are generally about 100 feet wide and in part are associated with fringing coral reefs. The southernmost beach at Lawayon is located at 6° 01′ N, 125° 41′ E. The second beach at Lamitan is at 6° 06′ N, 125° 42′ E; the beach at Lapuan is at 6° 08′ N, 125° 42′ E; and the beach at Lawa is at 6° 12′ N, 125° 42′

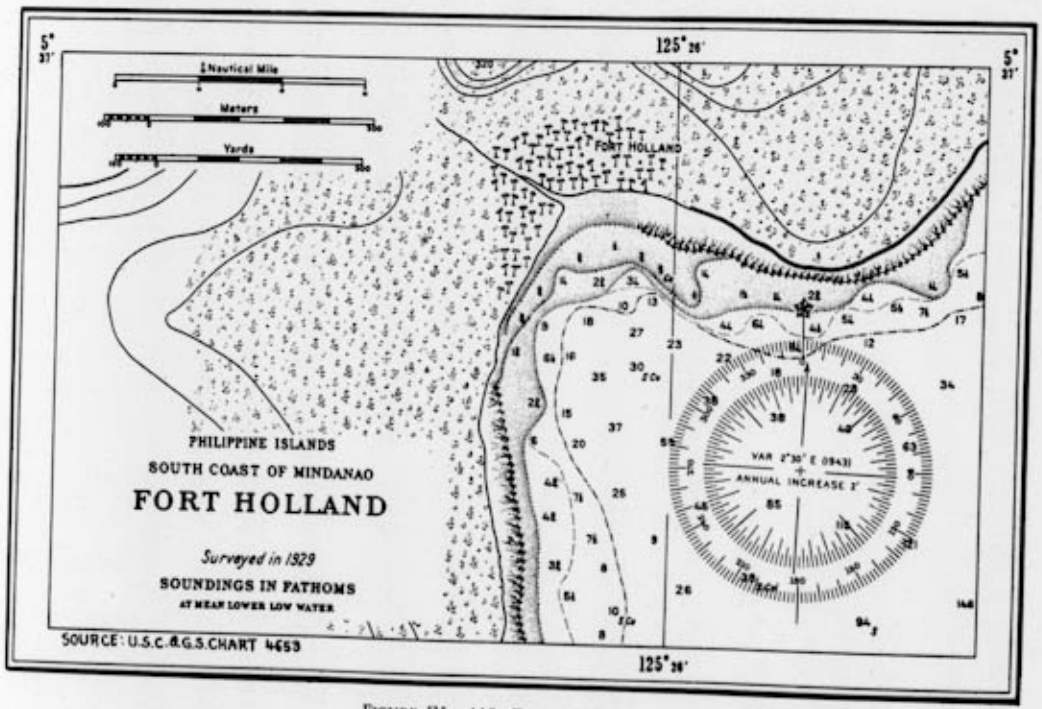

FIGURE IV - 110. *Davao Gulf area.*
Chart of Fort Holland, SW of Davao Gulf.

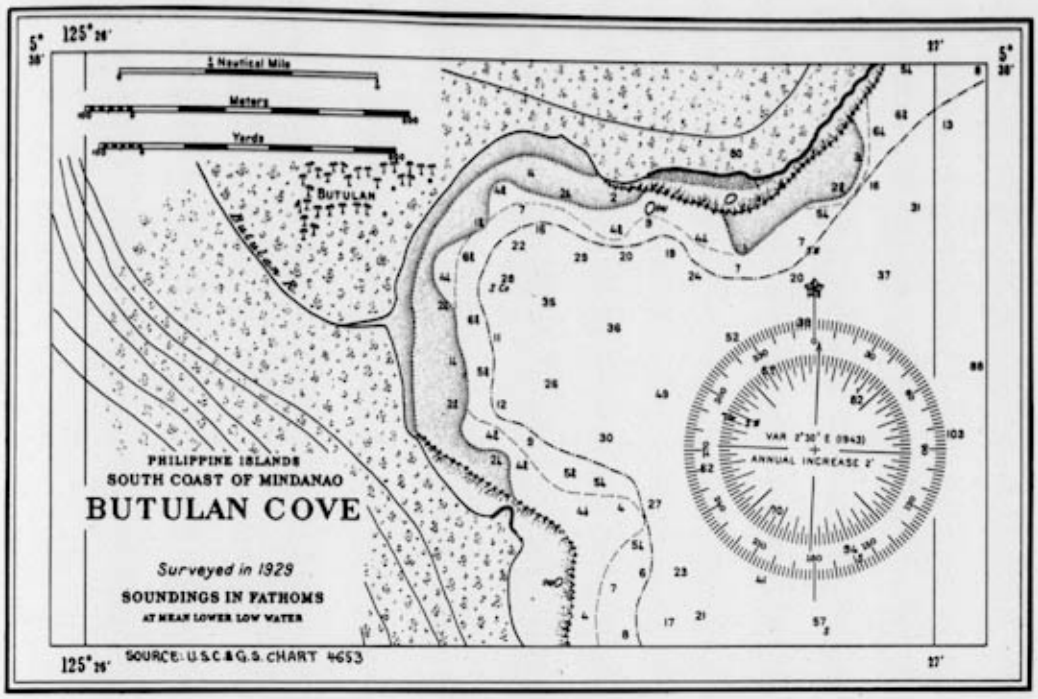

FIGURE IV - 111. *Davao Gulf area.*
Chart of Butulan Cove, SW of Davao Gulf.

E. Calian Point is bold and rugged and is the most easterly point along this section of the coast.

The approach to the coast is clear, and the bottom slopes in the nearshore area are generally steep. A fringing coral reef lines part of the shore, but data on its exact extent are not available. The bottom materials are mainly sand and mud. This section of the coast is exposed to winds and waves of the northeast monsoon. The average tidal range is 5 feet, and the flood tidal current moves southward along the coast from Calian Point. North of the point a weaker tidal current flows northward into Davao Gulf on flood.

The beaches are composed mainly of coral sand, generally firm and with slopes between 1 on 10 and 1 on 20. Most of them front coconut plantations (FIGURE IV - 112) or villages, and docks or small piers have been reported at Lapuan and Lawa (FIGURE IV - 113). The surf along the beaches may be heavy during the period of the northeast monsoon.

No trails are indicated parallel to the shore but a trail is reported from Lapuan to Lawa, and several trails lead inland from the vicinity of Calian Point. In general the terrain rises to hilly or mountainous country within a short distance of the coast.

P. Davao Gulf Area: Lawa to Colapsin Point.

(PLAN 28; U.S.C. and G.S charts 4608 and 4656)

(1) Offshore zone.

The distance of the 10-fathom line from shore varies from a few feet at Calian and Calilidan Points and on the north side of Kulungan Point to ⅜ of a mile in Kulungan Bay. The water deepens very abruptly off the coast, reaching depths ranging from 1,320 fathoms off Calian Point to 505 fathoms off Colapsin Point, within 5 miles from shore.

The nearshore sediments consist of sand, coral limestone, and coral debris, with a few mud patches between Tubalan Head and Colapsin Point. Information on the deeper water sediments between Calian and Bolton Points is not shown on the charts, but northward of Bolton Point they appear to consist entirely of muds.

Davao Gulf has its entrance between Calian Point on the west and Cape San Agustin on the east, some 30 miles apart, and extends about 70 miles northward. Samal and Talicud Islands occupy much of the northern part of the gulf. The water area north of these islands is so well protected that it is reported to rarely become rough, even during the height of the monsoon. The waters of the middle of the gulf are deep and clear. The shoals which fringe the western shore do not extend over 1½ miles seaward, but in the eastern part of the gulf, between Arena Point and Sigaboy Island, there are a number of dangerous detached shoals and reefs lying 3 to 4 miles from the coast and much foul ground at a lesser distance.

In general the tide floods westward past Cape San Agustin, directly toward the main shore of Mindanao where, between Banos and Calian points, it apparently splits, one flood stream going south toward Sarangani Strait, and the other, and slightly weaker stream, north into Davao Gulf. The ebb currents, setting in the reverse direction, are reported to be less violent than the flood.

(2) Coastal topography.

Between Calian Point and Malita rugged, heavily wooded mountains, with many short, swift streams along their slopes, rise abruptly from the cliffed shore line. The mountains are interrupted by small coastal flats, most of which extend a mile or less inland and are covered with coconut palms, around the

FIGURE IV - 112. *Davao Gulf area.*
Lawayon Bay, looking northward. Coconut grove back of beach, and steep headland, typical of this stretch of coast.

villages of Talagutong, Lais, Tingulo, and Malita. In most instances narrow river valleys lead inland from the flats. The largest of these isolated flats occur at Lais and at Malita.

Sandy beaches fringe the coastal flats at Talagutong, at a locality 2½ miles north of Talagutong, and at Lais, Malita, and Lacaron.

Malita (U.S.C. and G.S. chart 4656), the largest settlement on this section of the coast, is located on a coconut-covered alluvial flat which extends inland more than 2 miles and merges north and south with a narrow, coconut-covered coastal plain. The banks of the river are muddy and fringed by swamps on either side. A 1-way dirt road paralleling the shore connects the town with Lais on the south and Lacaron on the north.

Between Malita and Bolton Point the mountains are separated from the sea by a narrow coastal plain ¼ to ⅜ mile wide, broken for a short distance by hills and cliffs about ½ mile south of Lacaron.

From Bolton Point the coast trends northward for 1½ miles to Tubalan Head and then northwestward for nearly 13 miles to Colapsin Point, at the eastern entrance to Malalag Bay. It is the most deeply indented section of the coast in Davao Gulf, consisting of prominent bays separated by long narrow headlands. There is no coastal plain proper, but the heavily timbered mountains which rise directly from the shore are separated by broad alluvial flats near the heads of the bays. These flats are commonly bordered by mangrove swamps, back of which coconut and hemp plantations extend up the river valleys. From Tubalan Head to Colapsin Point the coast is fringed by coral reefs.

From 1 to 3 miles inland are numerous peaks, usually sharp, 600 to 1,400 feet high. Several miles farther inland, usually separated by pronounced valleys, are peaks ranging in height from 1,600 feet to nearly 4,000 feet. These interior peaks are generally covered with clouds. The fact that the whole system presents no definite ranges, but forms a confused mass of mountains, makes it difficult to identify individual peaks. The entire interior is heavily wooded.

Tubalan Head, 6° 30′ N, 125° 35′ E, is a gently rounded hill rising to a height of 558 feet, forming a prominent landmark. The isthmus connecting the hill with the mainland is low, giving it the appearance of an island when seen from a distance. The northeastern and eastern sides of the headland are clean and steep-to, without off-lying dangers. Off the northwest part of the headland the reef extends seaward for a distance of about 300 yards. A sandy beach occurs between Tubalan Head and Bolton Point.

Port Tubalan (U.S.C. and G.S. chart 4656) is a deep bay more than ¾ mile wide at the entrance, between the northwest extremity of Tubalan Head and Botak Point. Its coral-fringed shores consist of rocky cliffs alternating with stretches of mangrove swamp. Basol Islet is a steep, rocky bluff, with a few bushes on the top, lying on the reef in the southeastern part of the bay.

Botak Point, at the northern entrance to Port Tubalan, is a rugged peninsula 361 feet high, which slopes down abruptly to a rocky 40-foot bluff at the end of the point. Its sides are fringed by narrow reefs, but its extremity is clean and steep-to.

Between Botak Point and Sigarin Point 2¼ miles west-northwestward, there are 2 indentations formed by Minaban and Babak Points, of no particular value to navigation though without obstructions except the fringing shore reefs. A sandy beach surrounds Babak Point.

Sigarin Point, at the eastern end of Basiauan Bay, descends seaward in a gentle slope notched by 5 hills lying close to the gulf side, and ends in a bluff about 80 feet high. It is fringed by a coral reef, beyond which there is foul ground for nearly ¼ mile.

Basiauan Bay (U.S.C. and G.S. chart 4656) is 2¼ miles wide at the entrance between Sigarin and Sibalatan Points, and extends 1¾ miles southwestward. The middle of the bay is deep and clear, but the shores are fringed by reefs which extend ¼ mile in some places. The village of Basiauan lies at the head of the bay. Kumassie, on a broad coastal flat near the middle of

FIGURE IV - 113. *Davao Gulf, SW shore.*
Beach and pier at Lawa, Looking W.

the west shore, is the village of a large coconut and hemp plantation. The river valley behind Kumassie extends inland with a width of ½ mile for about 2 miles. Sandy beaches fringe the shore in front of both Basiauan and Kumassie.

A reef, bare at low water, extends nearly ¼ mile from Tambalan Point, in the center of the southeast shore of Basiauan Bay.

Sibalatan Point, the northwestern entrance point to the bay, is not prominent from the northwest or southeast. It terminates in a ridge over 200 feet high, at the end of which is a curved embankment pointing southward. The point is fringed by a coral reef, with foul ground outside of it, which extends about ¼ mile seaward.

Kulungan Point, situated nearly 3½ miles, 321° true, from Sibalatan Point, is easily identified as a sharp tongue of land projecting northeastward, bordered by bare, rocky, yellow bluffs. The point is fringed with coral, but may be rounded in safety at a distance of ¼ mile.

Between Sibalatan and Kulungan Points there is a wide bay divided into 2 smaller bays by Kabalantian Point. Monkiaua Bay, the southernmost of the 2, has a clear center, but the shores are fringed with coral. Kulungan Bay, the northernmost of the 2, is fouled with a number of shoals. A sandy beach lies at the head of the bay.

From Kulungan Point to Colapsin Point, about 4 miles northwestward, the shore is bold and rocky, with stretches of sand beach and a fringe of coral 30 to 350 yards wide.

Cliff Point, 390 feet high, located nearly midway between Kulungan and Colapsin Points, is clean and steep-to.

Colapsin Point, the northeastern extremity of the peninsula forming the northern side of Malalag Bay, rises to a height of 265 feet. It is well wooded and fringed by a narrow coral reef which extends outward about 350 yards.

(3) Anchorages.

For anchorages off Malita and Lacaron, see Chapter VI.

The best anchorages in Port Tubalan (U.S.C. and G.S. chart 4656) are in the western corner of the bay, about ¼ mile from shore in 20 or 22 fathoms, muddy bottom, and in the southeastern corner in 22 to 24 fathoms, muddy bottom, with Basol Islet bearing 115° true, distant about ¼ mile.

The best anchorage in Basiauan Bay (U.S.C. and G.S. chart 4656) is found at the head of the bay, northeastward from the town, in 14 to 16 fathoms, muddy bottom. It is sheltered from all winds except those from north to northeast. The reefs on both sides of the anchorage have about 1 foot of water on them at low water and mostly show a dark brown color. The approach to the anchorage is free from dangers, aside from the shore reefs.

(4) Dangers to navigation.

A small shoal, covered by a least depth of 2 fathoms, lies nearly 1¼ miles northeastward from Kabalantian Point on the bearings: Sibalatan Point 163° true and Kulungan Point 300° true.

All the shoals in Kulungan Bay lie inside a line drawn from Sibalatan Point to Kulungan Point. Some of these shoals are awash at low water.

There is a small coral shoal, covered by a least known depth of 3½ fathoms, lying ⅝ of a mile from Colapsin Point, on the bearings: Colapsin Point 207° true and Mount Piapi 271° true. This shoal should be avoided, as there may be shallower coral heads on it.

(5) Landing beaches.

(a) Lais beaches. (PLAN 28, Section F(c); FIGURE IV - 114) Reliability POOR. Three sand beaches occur in the general vicinity of Lais on the west shore of Davao Gulf. The Lais beach is just north of Quilapii Point and the other 2 beaches are situated about 2 and 5 miles southward, respectively. The Lais beach lies at 6° 20′ N, 125° 39′ E; and the other beaches lie at 6° 18′ N, 126° 39′ E, and 6° 16′ N, and 126° 40′ E. There are no conspicuous landmarks.

The approach to the shore is clear, and the nearshore bottom slopes are fairly steep, especially along the fringing coral reefs which extend interruptedly along the coast. The bottom materials are mud and sand, largely of coral origin. The mean tidal range is 5 feet, and the flood tidal current moves northward along the coast. The beaches are exposed to winds and waves during the northeast monsoon.

The beaches, composed of sand, mainly of coral origin, are firm and have slopes of about 1 on 20. The beach at Lais (FIGURE IV - 114) is bordered on the south by a fringing reef but extends northward beyond the reef limits.

The beaches are backed by coconut plantations. The inland terrain rises in moderate to steep slopes from the shore, but just south of Lais a river valley leads inland through the hilly and mountainous country. A trail runs northward along the coast from Lais, and another leads inland from a point some distance southward of the beach.

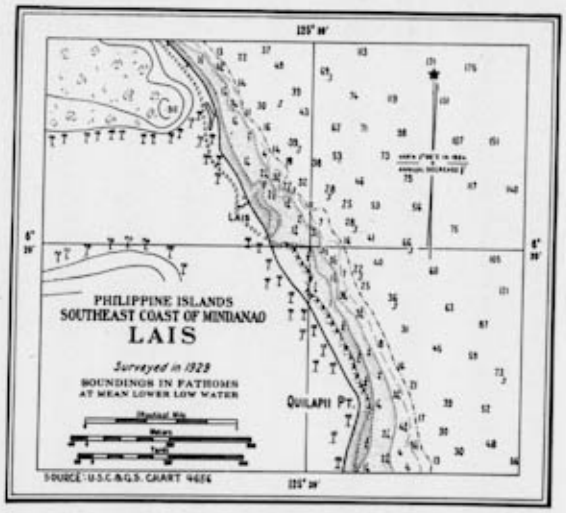

FIGURE IV - 114. *Davao Gulf, SW shore.*
Chart of Lais.

(b) Malita beach. (PLAN 28, Sections F(d), F(e); FIGURES IV - 115 to IV - 117) Reliability FAIR. An extensive sand beach extends from just north of Quilapii Point northwestward and northward around Malita Point to Tubalan Head. It is about 13 miles long and generally narrow. Locally, as around Malita Point, it may attain a width of about 100 feet at low water. The limits of the area lie at 6° 19′ 45″ N, 125° 39′ 00″ E, and 6° 29′ 45″ N, 125° 35′ 30″ E. No conspicuous landmarks lie along the southern part of the beach, but at the northern limit is Tubalan Head, a prominent rounded hill 558 feet high. The offshore approach to the beach is clear.

Nearshore the bottom slopes are generally moderate, ex-

cept at the mouth of the Malita River where shifting bars may be encountered, and along the northern 2 miles of beach where the bottom gradient steepens. Stretches of fringing coral reef line parts of this coast, most notably at Tingulo Point and in the vicinity of Bolton Point. FIGURE IV - 115 shows the approach to the beach at Malita. The bottom materials are mud and sand, partly of coral origin. The mean tidal range is about 4½ feet, and the flood tidal current moves to the northwest and north. The beaches are exposed to winds and waves from the north and northeast, most prevalent during the winter months.

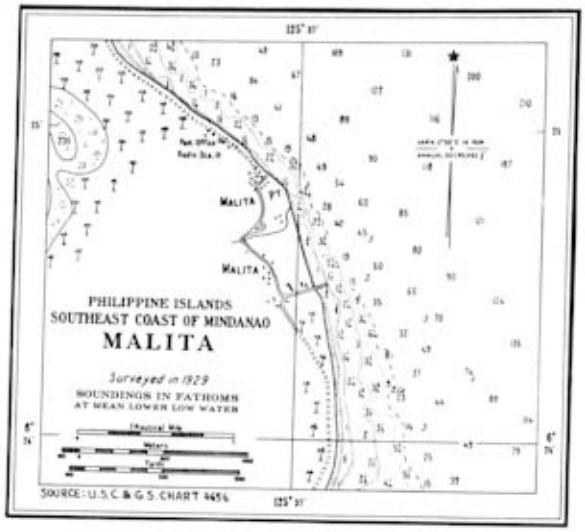

FIGURE IV - 115. *Davao Gulf, SW shore.*
Chart of Malita.

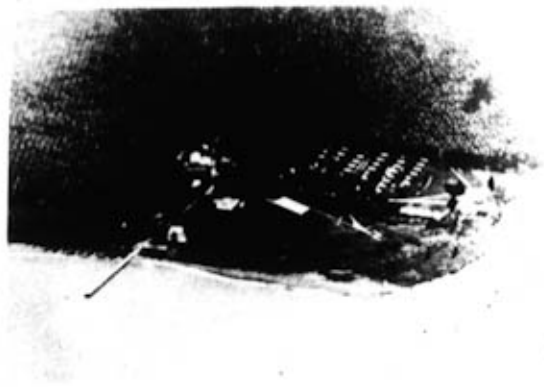

FIGURE IV - 116. *Davao Gulf, SW shore.*
Beach, pier, and coconut grove at village of Malita, looking southwestward. Mouth of Malita River in right foreground.

FIGURE IV - 117. *Davao Gulf, SW shore.*
Malita pier and beach, looking westward. Typical narrow lowland covered with coconut palms and backed by steep hills. Prior to April, 1935.

The beach is composed of sand with mixtures of coral sand and debris in the areas along the fringing coral reef. Rocks are exposed at low tide near the northern limit. The beach is generally firm with local soft areas around the river mouths. The slope is moderate, probably varying from about 1 on 10 to 1 on 25 around Malita Point. A pier about 300 feet long is located about 1,500 feet south of the river mouth at Malita (FIGURES IV - 116 and IV - 117), and another, reported to be in poor repair, is located at the settlement of Lacaron. Surf is moderately heavy over a broad belt when north and northeast swell is running.

A narrow coastal plain, generally cultivated in coconut groves, lies behind the beach (FIGURE IV - 116). The plain widens inland around Malita and northward of Bolton Point. Inland are steep wooded slopes which approach close to the shore about 1 mile north of Tingulo Point. Lais, Malita, and Lacaron are the most important settlements along the shore. Malita lies partly behind the pier and partly along the shore northward. A radio station is located in the town and fresh water is available. A coastal trail connects Lais and Malita. From Lacaron a trail runs inland to the west and another runs northwest to Tubalan at the head of Port Tubalan.

(*c*) *Port Tubalan beaches.* (PLAN 28, Section F(f); FIGURE IV - 118) Reliability FAIR. Along the shores in the vicinity of Tubalan Head and of Port Tubalan to the northwest, are several sand beaches totaling nearly 2 miles in length. The beach along the eastern shore of the isthmus of Tubalan Head lies at 6° 29′ 30″ N, 125° 35′ 30″ E, and the center of Port Tubalan is at 6° 29′ 50″ N, 125° 34′ 30″ E. Tubalan Head is a rounded hill 558 feet high.

The approach to the head and to Port Tubalan is clear, although a fringing coral reef extends northwestward about 1,000 feet from the head. Nearshore the bottom slopes are moderate to steep, especially along the fringing reef which lines the entire bay shore (FIGURE IV - 118). Small areas of reef also occur at the limits of the beach along the isthmus connecting Tubalan Head with the mainland. Port Tubalan is open to the northeast, although locally within the bay are areas sheltered by small headlands. The average range of the tide is about 5 feet, and the flood tidal current moves northwestward past Tubalan Head.

The beach along the eastern shore of the isthmus at Tubalan Head is composed of sand, but some rocks are exposed at low tide. The beaches within the bay are all composed of coral sand and lie along the inner edge of a fringing reef which averages about 500 feet wide but locally is narrower. All the beaches are moderately firm, and the slopes of those within the bay are about 1 on 10 to 1 on 20. The beach along the Tubalan Head isthmus probably has a slope of about 1 on 20. There are no structures along the beaches. Surf varies in intensity and is lightest along the north shore of Port Tubalan.

The terrain inland of this area is locally a coastal lowland rising to hilly country. Between Tubulan Head and the mainland is a low isthmus partly covered with mangrove. Mangrove also oc-

curs at intervals along the bay shore between the several beaches. The hills themselves are generally wooded. The small settlement of Tubalan near the head of the bay is connected by trail to Lacaron on the south and to several villages farther northwest.

FIGURE IV - 118. *Davao Gulf, SW shore.*
Chart of Port Tubulan.

(*d*) *Babak Point beaches.* (PLAN 28, Section F(g)) Reliability FAIR. A sand beach lines the shore on both sides of Babak Point, which is located at 6° 32′ N, 125° 34′ E. The beach just south of the point lies in a small cove and is less than 1,000 feet long, whereas the beach northwest of the point is nearly a mile long, but is narrow. Sigarin Point lies just west of the latter beach. It ends in a bluff about 80 feet high which is backed by gentle slopes notched by 5 hills.

The approach to the beaches is clear, and within the 30-foot depth the bottom slopes are steep to the fringing coral reefs which line the shore. The beaches are exposed to winds and swell from the northeast. The mean tidal range is about 5 feet, and the tidal currents move northwestward on flood. The bottom materials are sand and mud, largely of coral origin. The beaches are composed of firm coral sand and debris, with slopes varying between 1 on 6 and 1 on 10. No structures occur along the beaches. The beaches are interrupted by Babak Point, and a small tidal stream flows into the cove at the south end.

The terrain behind the beaches is steep and rises to wooded hills. No trail is known to extend inland from the beaches themselves, and the nearest trail lies about 2 miles inland.

(*e*) *Kumassie beaches.* (PLAN 28, Section F(h); FIGURE IV - 119) Reliability GOOD. The small settlement of Kumassie lies in Basiauan Bay, with several beaches in its vicinity. The southernmost one is at the head of the bay at 6° 31′ 05″ N, 125° 31′ 30″ E. The central beach lies at 6° 31′ 40″ N, 125° 31′ E, and the northern beach lies at 6° 32′ 30″ N, 125° 30′ 30″ E. Sibalatan Point at the northwestern entrance to the bay is easily recognized from the northeast by the terminal ridge over 200 feet high.

FIGURE IV - 119. *Davao Gulf, W shore.*
Chart of Kumassie

The approach is clear, and most of the shore of the bay is lined with a fringing coral reef which bares at low water (FIGURE IV - 119). The reef is interrupted at the southern end of the bay and at the mouth of Tibungoi Creek. The bottom materials are mainly coral sand and mud with some rocky areas. The bay opens to the northeast and is exposed to winds and swell during the northeast monsoon. The average tidal range is about 5 feet and the tidal current moves northwestward along the coast outside the bay. The beach at the southern end of the bay is about 3,300 feet long, interrupted by a short area of mangrove. The eastern part of the beach is bordered by tidal flats about 600 feet wide, but the western part fronts the village of Basiauan, and is bordered in part by a fringing reef nearly 1,500 feet wide, which extends northward of the beach proper. The central beach along the western shore of the bay is about 3,000 feet long and extends to the settlement of Kumassie, although the northern half is directly lined with mangrove. This beach is largely fronted by a fringing reef nearly 1,500 feet wide. The northern beach extends for about 2,500 feet northwestward of Tibungoi Point and is fronted by a coral reef averaging about 300 feet wide.

All these beaches are composed of coral sand locally mixed with non-coral material, especially at the southern end of the bay and at Kumassie. The softer portions of the beach lie along the tidal flats; elsewhere the beach is generally firm. The beach slopes are flattest along the tidal flats, but the beach at Basiauan and north of Tibungoi Point have slopes as steep as 1 on 10. The best landings apparently are at Basiauan and at Kumassie. There are no structures on the beaches. The surf may locally be heavy

during the northeast monsoon, with the greatest surf intensity north of Tibungoi Point.

A trail runs along the shore connecting Kumassie and Basiauan. The trail continues eastward around the southern end of the bay and also runs northwestward from Kumassie. A trail leads from the landing place at Kumassie to a plantation inland. The terrain is low along the bay, hilly to the south and north. Cultivated fields extend inland behind Kumassie, but the shore is fringed with mangrove areas and some coconut plantations as at Basiauan.

(f) Kulungan Bay beach. (PLAN 28, Section F(i)) Reliability GOOD. The shore of Kulungan Bay is lined by a broad sand beach, interrupted by a rocky stretch at Kabalantian Point. The total length of the beach is about 2 miles, and the maximum width is about 100 feet. The limits of the beach are at 6° 35′ N, 125° 28′ 40″ E, and 6° 33′ 10″ N, 125° 30′ 40″ E. A prominent landmark is Kulungan Point, a sharp tongue of bare yellow rock running down to the water.

The approach to the area is obstructed by a rocky shoal about a mile northeast of Kabalantian Point, and by another shoal closer to shore, about ¾ mile southeast of Kulungan Point. A third shoal lies inshore of this second shoal a short distance to the southwest. Within the 30-foot depth the bottom slope is moderate to the fringing coral reef which lines much of the bay shore. The bottom materials are mainly coral sand and mud, with some rocky patches. The bay is exposed to the northeast winds and waves during the northeast monsoon. The mean tidal range is 5 feet, and the flood tidal current moves northwestward along the shore.

The beach is composed of coral sand and debris. It is firm and has slopes varying from about 1 on 10 to 1 on 20. No structures are known along the beach. Surf is heavy when swell is running, and shore drift is southeastward along the beach.

The southern portion of the beach is backed by slopes leading to high hills, but the northern portion is backed by a river plain, largely cultivated, which extends northwestward to the head of Malalag Bay. A trail from Kumassie to Malalag Bay traverses this valley, but no shore trails are known. Relatively isolated short stretches of beach also occur along the shore west of Kulungan Point, but detailed information regarding them is lacking.

(g) Kulungan Point to Colapsin Point beaches. (PLAN 28, Section F(j); FIGURE IV - 120) Reliability FAIR. Numerous beaches extend along the shore between Kulungan Point (6° 35′ 45″ N, 125° 28′ 45″ E) and Colapsin Point (6° 37′ 45″ N, 125° 25′ 30″ E). The beaches vary from about 1,000 feet to about 1 mile in length, and average about 50 feet in width at low water. Kulungan Point itself, a sharp tongue of bare yellow rock running down to the water, is a prominent landmark for the eastern limit of the area. Colapsin Point at the western limit rises to a height of 265 feet. The approach to the beaches is clear except for a shoal located about 3,200 feet northeast of Colapsin Point (FIGURE IV - 120). Near shore the bottom slopes are moderate to the fringing coral reef which fronts the entire beach. The bottom is mainly coral sand, but is locally rocky. The beaches are exposed directly to north and northeasterly winds and waves. The average tidal range is about 4½ feet, and the flood tidal current moves northwestward.

The beaches are composed mainly of coral sand with some coral debris. Figure IV - 121 shows the beaches just southeast of Colapsin Point. The beaches are generally firm and have slopes of about 1 on 10. The coral reef which fronts the beaches attains a width of about 500 feet near the northeastern end. No structures are known along the beaches. Surf is heavy when swell is running, and the shore drift is generally to the southeast.

The terrain immediately behind the beaches rises in moderate or steep slopes, heavily wooded (FIGURE IV - 122). No trails are known in the vicinity of the beaches. The nearest trail runs westward and southeastward from the village of Dool along the southeastern shore of Malalag Bay.

Q. Davao Gulf Area: Colapsin Point to Davao.

(PLAN 28; U.S.C. and G.S. charts 4608, 4624, and 4656)

(1) Offshore zone.

The 10-fathom line, lying ⅛ to 1⅜ miles offshore, is farthest from the coast in Malalag Bay, in the area between Digos Point and Tagabuli Bay, and between Dumalag Point and Davao. The water within 5 miles from the coast attains a maximum depth of 541 fathoms off Malusi Point.

The bottom sediments within the 10-fathom curve consist of sand, coral limestone, and coral debris, with areas of mud off the river mouths. The deeper water sediments are composed of mud, with scattered coral heads and a few sand patches.

(2) Coastal topography.

Malalag Bay (FIGURE IV - 120), situated in the southwest part of Davao Gulf, is about 4 miles long southeast—northwest, and 1 mile wide. The eastern entrance point, about ½ mile west-southwest from Colapsin Point, rises to a height of 189 feet, and is surrounded by a coral reef, the western extremity of which lies about ⅜ mile 240° true from the point. Shoal water extends for ½ to ¾ mile beyond the western shore of the entrance, leaving a channel 1 mile wide into the bay. The entrance is clear and deep, with the exception of Bolton Reef, lying in the middle of the channel.

A discontinuous coral reef fringes the shores of the bay. At the head of the bay there is considerable foul ground, the western limit of which is marked by an islet 60 feet high. The western part of the bay is shoal for a distance of ⅜ to ⅞ mile offshore.

A small alluvial plain lies at the southeastern end of the bay. On the western shore, extending from the Balasinon River to Mount Piapi, there is a coastal plain which attains a maximum width of over 6 miles (FIGURE IV - 123). Both these flats are planted to coconuts and hemp and fringed by mangrove swamps. The remainder of the bay is surrounded by high, heavily wooded hills (FIGURE IV - 124).

About 1 mile eastward from the village of Bolton (Malalag) just south of a steep rocky point, is a fine sand beach, which for a short distance is without fringing coral and has deep water close-to.

Bolton lies near the western extremity of the south shore of the bay and is surrounded by several coconut and hemp plantations. A good 2-lane unsurfaced road leads northward along the coast through Padada to Digos.

Mount Piapi is an isolated heavily wooded hill, 640 feet high, close to the beach, about 3 miles 282° true from Colapsin Point. It forms a good landmark which can be recognized from a considerable distance.

From Mount Piapi to Malusi Point, 14½ miles, the coast trends 17° true, with an intervening slight embayment.

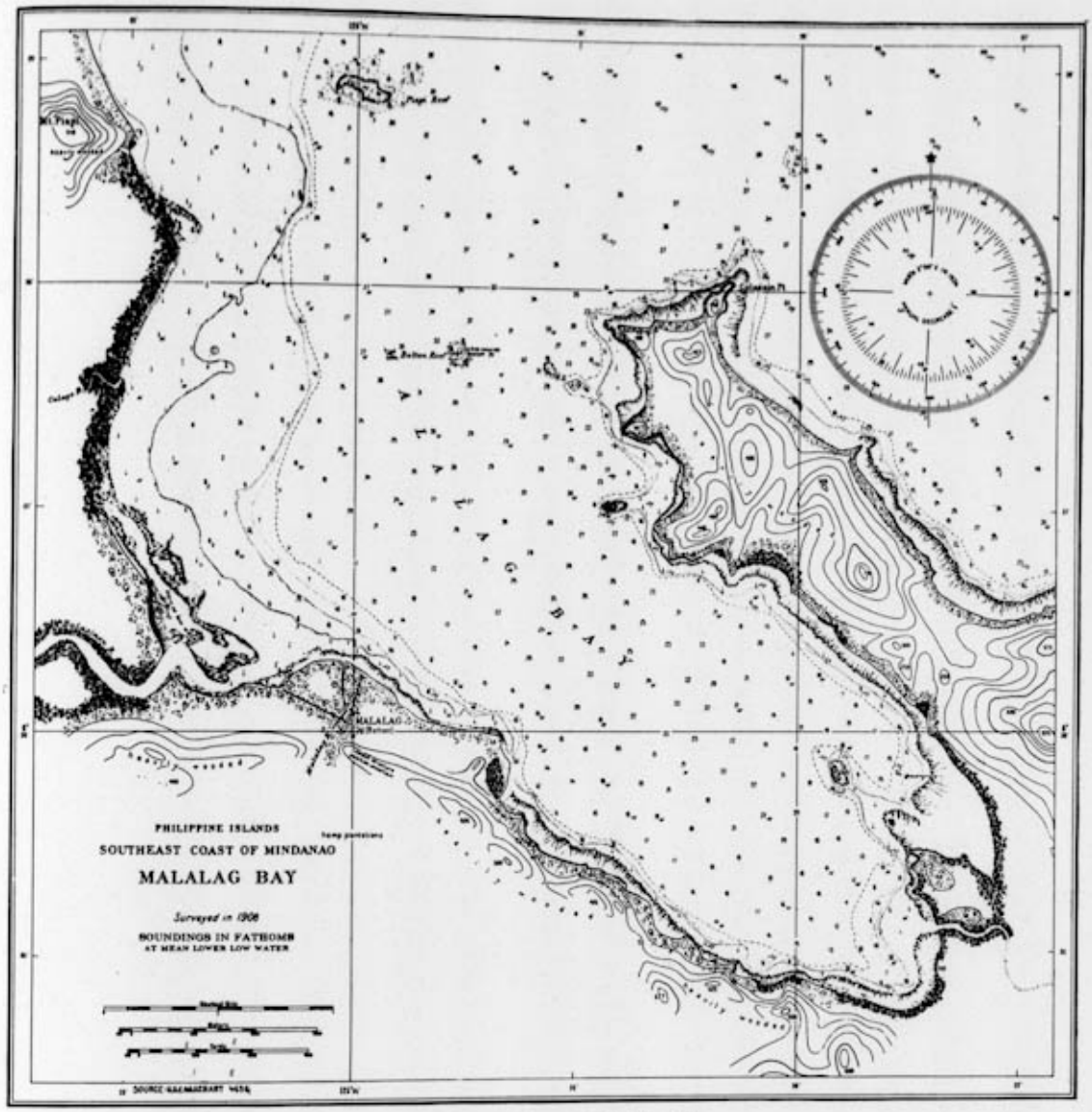

FIGURE IV - 120. *Davao Gulf, Malalag Bay.*
Chart of Malalag Bay and Colapsin Point, W shore of Davao Gulf.

From Malusi Point the coast trends 41° true for 15 miles to the mouth of the Davao River, with a broad intervening embayment. The heavily timbered coastal mountains form the foothills of a high volcanic range which culminates in Mount Apo. Between Digos and Davao a locally discontinuous, partially cultivated, coastal plain ⅛ to 1½ miles wide separates these mountains from the sea.

Where the larger rivers enter the gulf, the coastal plain merges with alluvial flats which extend up the river valleys for some distance inland. The coast is intersected also by a number of small streams, none of which are navigable by steam launches. At low water they are difficult to enter, even with a pulling boat.

From Tagabuli Bay northward to Davao an almost continuous sandy beach parallels the shore. The shores are fringed with reefs, and detached reefs lie from 1 to 1½ miles from the coast in some localities. The anchorages are poor and in many cases rendered difficult of access by the offlying reefs. Between Mount Piapi and Digos an alluvial flat, covered with numerous coconut and hemp plantations, extends 7 to 10 miles inland.

The Umbakanan River discharges about 1½ miles north of Mount Piapi. Between these 2 points the coast is low, flat, and bordered by mangrove swamps. A coral platform about ½ mile wide fringes the shore line. This platform is blanketed by sand flats, lying between the mangroves and the outer edge of the reef, which bares at low water. The coastal plain behind the

FIGURE IV - 121. *Davao Gulf, Malalag Bay.*
Outer side of Colapsin Point, with beaches, looking SSW. 1935.

FIGURE IV - 122. *Davao Gulf, Malalag Bay.*
End view of Colapsin Point, looking SE, showing the steep wooded slopes behind the beaches. 1935.

mangroves is interrupted by an occasional low hill, and is covered by dense woods alternating with coconut and hemp plantations.

On the shore reef, about midway between the mouths of the Umbakanan and Padada Rivers there is a clump of mangroves forming an island even at low water. It is a prominent landmark about 400 yards from the shore.

The Padada River, emptying 1½ miles north of the Umbakanan, is the largest river in this vicinity. The town of Padada lies on the left bank of the river, about ½ mile inland. From the

FIGURE IV - 123. *Davao Gulf, Malalag Bay.*
Coastal plain back of W shore of Malalag Bay, just N of Balasinon River, looking westward. 1935.

mouth of the Padada River the coast trends northward with a curve westward for about 4 miles to Digos Point. This section of the coast is very swampy, but is fronted by a fine sand beach nowhere exceeding ¼ mile in width, which is fringed with coral. The Digos and Balutakay Rivers discharge about 1 and 2¾ miles, respectively, south-southwestward from Digos Point. Between Padada and Digos the coastal highway lies about 1½ miles inland.

Digos Point is low, flat, and wooded. It is fringed with mangroves and surrounded by a steep-to coral reef, which bares at low water to a distance of nearly ¼ mile. Digos Point is fairly prominent when seen from northward or southward. The channel between the point and the off-lying reefs is about ⅛ mile wide and has a depth of 7 to 13 fathoms.

Digos (FIGURE IV - 125) is a village of little importance, lying on the north bank of the Digos River, about ½ mile inland. A large iron warehouse, located on the beach about ¼ mile southward from the mouth of the river, forms a good landmark visible from a long distance offshore. The town is connected with Davao by a highway which follows the coast line rather closely.

Digos Islet is a white coral sand cay rising about 2 feet above high water. It is sparsely brush-covered, and stands on a reef about 1 mile south of Digos Point and about 700 yards east of Digos warehouse. The reef extends about 300 yards eastward from the islet, and partly bares at low water.

Tagabuli Bay, the southern entrance to which is 2¼ miles northward from Digos Point, is not readily made out from seaward because its shore line consists entirely of mangrove swamps. It extends about ⅞ mile northwestward and has a general width of about ¼ mile. The head and sides of the bay are fringed with coral, which bares at extreme low water.

The shore between Tagabuli Bay and Santa Cruz Point is fronted by reefs, which are covered with white coral sand visible from a considerable distance.

Santa Cruz Point, 2½ miles northeast of Tagabuli Bay, is low and wooded. North of the point, heavily wooded precipitous hills rise a short distance from the coast. Two conspicuous patches of cogon grass extend in a horizontal line, at an elevation of 600 to 800 feet on the flanks of these hills, about 1½ miles northward of Santa Cruz. About 3 miles west-northwest of Santa Cruz, at an elevation of 1,200 to 1,500 feet, there is another patch of cogon grass on the mountain slopes. These patches can be seen from a long distance and form good landmarks, especially for vessels bound for Santa Cruz. (FIGURE IV - 126)

Santa Cruz is a village on Santa Cruz Point. It is obscured

FIGURE IV - 124. *Davao Gulf, Malalag Bay.*
Looking southward into Malalag Bay along its E side, from vicinity of Colapsin Point, showing the steep wooded hills that surround most of the bay. 1926.

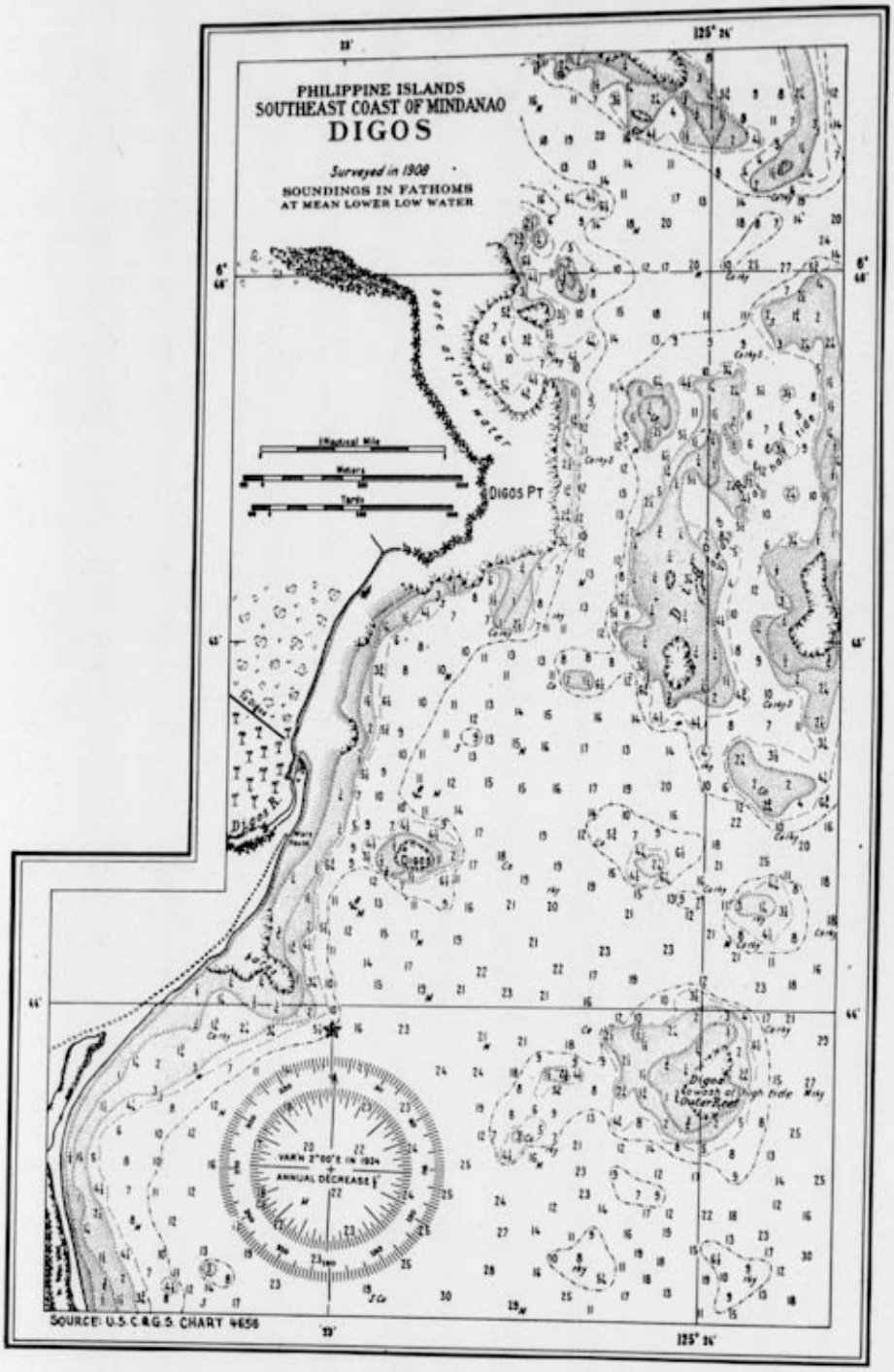

FIGURE IV - 125. *Davao Gulf, W shore.*
Chart of Digos vicinity.

from seaward by trees. The narrow coastal plain between Santa Cruz and Astorga consists principally of swamps and brush-land. There are some coconut and hemp plantations between the beach and the coastal highway, particularly where the plain broadens northward from Malusi Point.

Mount Apo is about 13 miles 317° true from Santa Cruz Point. It is a high volcanic cone with steep, generally symmetrical slopes, culminating in a rounded summit containing a small crater. The peak forms the highest point on the Island of Mindanao, rising to an elevation of 9,690 feet. On the south side of the volcano, and about 1,000 feet below the summit are the remnants of a large secondary crater, the outer wall of which has been blown away. Sulphurous steam constantly issues from a number of fissures in the mountain slopes. Mount Apo and the surrounding peaks are almost constantly enveloped in clouds from March to June.

From Santa Cruz the coast trends northeastward for about 3 miles to Malusi Point, forming a slight coral-fringed indentation. There is very little lowland encircling this indentation, and heavily timbered volcanic mountains rise rapidly to heights of 2,500 feet within 1 mile from the coast. Facing the indentation are a number of reefs about ½ mile offshore. Malusi Point is low and rounding, and not very prominent.

Between Malusi Point and Tagulaya Point 3¾ miles northeastward the shore consists of a sandy beach interrupted only by a small mangrove swamp near Astorga.

Astorga is situated about 2 miles northward of Malusi Point. Along the mangrove-covered strip near the village and for ¼ mile on either side of the mangroves, there is a fringe of broken coral thrown up by the sea. The coastal highway lies only about $\frac{1}{10}$ mile from the beach here. All the interior in this vicinity consists of heavily wooded mountain slopes furrowed by deep valleys. (FIGURE IV - 127)

Tagulaya Point, lying 2¼ miles northeast of Astorga, is low and wooded, and fringed by a narrow gravel beach. From Tagulaya Point to the mouth of the Sirawan River, 4 miles northward, the shore is wooded down to the broad sandy beach.

The village of Darong lies on the shore about 1 mile north of Tagulaya Point, and may be recognized by a large, prominent, greenish-white house with a galvanized iron roof, visible from a distance of 8 to 10 miles at sea.

The Sirawan River has 5 to 6 feet of water on its bar at low water, but is not navigable for a ship's launch for more than ½ mile. The village of Sirawan is very small.

Daliao, situated at the mouth of the Daliao River, about 1½ miles northeastward of Sirawan, is the headquarters of a large plantation and the most prominent settlement in this vicinity. The large warehouses of the plantation are very conspicuous from seaward. Daliao Light* was displayed at an elevation of 85 feet from the top of a tower on 1 of the main plantation buildings. There is a highway connecting with Davao paralleling the coast as far as Talomo.

From Daliao the coast trends northeastward, eastward, and southeastward to Dumalag Point, forming a large, deep, clear bay. The small villages of Lipadas, Dumuy, and Matina lie along its shores. The surrounding coastal plain is low and level, and, with the exception of the Talomo area on the north, is heavily wooded down to the beach. A number of small, unimportant streams discharge into this bay.

Talomo Bay forms the northern portion of the large bight between Tagulaya and Dumalag Points. The village of Talomo lies on the west bank of the mouth of the Talomo River at the head of the bay. The large warehouses show well to seaward. The town is built behind the beach on a broad strip of dry land, which is succeeded on the north by a mangrove and nipa palm

*In this chapter, description of lights and other man-made navigational aids is stated in the past tense, on the basis that such aids would not be available in wartime. All other description is in the present and represents the best information available in Washington, D. C., in April 1944 when the chapter was being prepared. Many of the structures mentioned may have been damaged or destroyed.

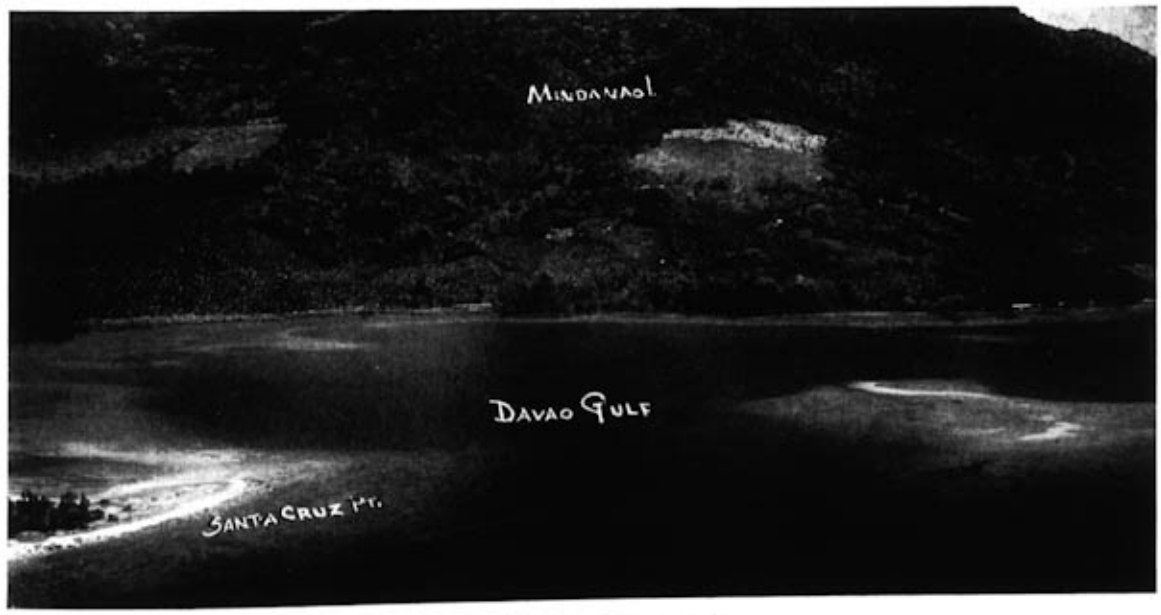

FIGURE IV - 126. *Davao Gulf, W shore.*
Santa Cruz Point, looking northward. Characteristic steep wooded hills, with patches of grass and cultivation, along main coast. 1935.

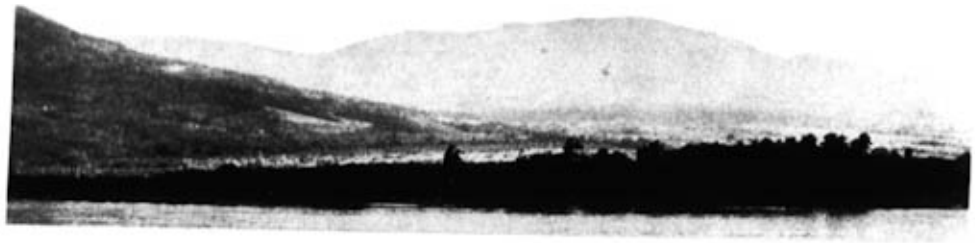

FIGURE IV - 127. *Davao Gulf, W shore.*
Beach just N of Astorga, looking northwestward. Prior to April 1935.

swamp ¼ to ⅓ mile wide. The valley of the Talomo River extends inland for some distance with a width of 5 to 3 miles. The river flat and the narrow coastal plain on either side of the river mouth is mostly planted to coconuts. Hemp is extensively cultivated on the rolling foothill slopes inland.

Dumalag Point, a long, low, heavily wooded peninsula, is the most conspicuous promontory in this region (FIGURE IV - 128). Dumalag Island, forming the southern end of Dumalag Point, is about ⅓ mile long, and is separated from the promontory by a passage navigable only for small boats. The southern extremity of the island is fringed by coral which bares for a distance of about 200 yards from shore at low water.

From Dumalag Point the coast trends northeastward for about 3 miles to the mouth of the Davao River. It is low, swampy, and bordered by a sandy beach. Shoal water extends about ¼ mile from shore; farther out the water deepens very rapidly.

(3) Anchorages.

(a) Malalag Bay. (FIGURE IV - 120) The usual anchorage in 10 fathoms, about ¼ mile northward from the village of Bolton, is bad in northerly winds, which have a long sweep down the gulf, and even with southerly wind there is some sea here. About 1 mile eastward from the town, just around a bluff, rocky point, is a fine sand beach, which for a short distance has deep water close-to and no coral off it. Ships of any size can anchor close in here. Vessels entering for shelter will also find good protected anchorage between the islet near the head of the bay and the north shore, in about 20 fathoms.

(b) Digos. Anchorage may be found south of Digos Islet, with the warehouse bearing 317° true, distant ¼ mile, in 12 to 15 fathoms; or north of Digos Islet, with the warehouse bearing 249° true, distant about ⅜ of a mile, in 11 to 12 fathoms of water. Small vessels may anchor between the islet and the warehouse. A very rough swell runs in at Digos during the northeast monsoon.

(c) Tagabuli Bay. Anchorage protected from winds, except those from the east-southeast, may be found in the middle of the bay in from 16 to 20 fathoms, muddy bottom, where there is a width of about 400 yards between the edges of the reef.

(d) Santa Cruz. For anchorage off this town see Chapter VI. Better-protected anchorage may be found in a cove about 1 mile northeastward from Santa Cruz, in 17 to 18 fathoms, muddy bottom, back of a reef which bares at half tide. This anchorage is protected from all except strong southeast winds.

(e) Daliao and Talomo. For anchorage off these towns see Chapter VI.

(4) Dangers to navigation.

Bolton Reef, covered by a least depth of ½ fathom, lies in the middle of the entrance to Malalag Bay (FIGURE IV - 120), dividing it into two channels, of which the western passage is the wider and better. The reef is very small, and is surrounded by deep water. This danger is marked by a concrete beacon standing in 11 feet of water and rising to a height of 17 feet above sea level. There are no dangers to navigation within the bay after passing Bolton Reef.

Piapi Reef, lying about 1⅛ miles 78° true from the point at the foot of the eastern slope of Mount Piapi, bares about 1 foot at low water. There is a small detached 1½ fathom patch about ⅛ mile eastward of Piapi Reef.

About 1¼ miles southward from Digos Warehouse and ⅜ mile from shore, there is a small detached shoal covered by a least depth of 3 fathoms.

The Digos Reefs lie northeastward, eastward, and southeastward from Digos Point. Parts of them bare at low water, but the area baring is very small compared with the total extent of the reefs. A north—south line, passing 1½ miles east of Digos Point, will lead well clear of them. There is a deep, narrow channel between the shore reef and the Digos Reefs, and several channels between the Digos Reefs themselves, but in the absence of local knowledge and any aids, navigation must be conducted with caution. Digos Outer Reef, the southeasternmost danger in this vicinity, is awash at high water. This reef is steep-to on the eastern and southern side, but on the western side foul ground extends nearly ½ mile. There is a good, deep channel about 400 yards wide and 11 to 23 fathoms deep, between Digos Outer Reef and the next reef northward, but in the absence of any aids to navigation, strangers are advised not to attempt it, but to pass southward and westward of Digos Outer Reef.

There are a number of reefs facing the bay between Santa Cruz and Malusi Points. Two small shoals, covered by depths of 4¾ and 3¼ fathoms, lie nearly ¾ mile 169° true and 191° true, respectively, from Malusi Point, on a bank about ½ mile long in an east—west direction inside the 10-fathom curve. There is deep water between this bank and the point..

In the small bight on which Astorga is situated there are a number of detached shoals. A little more than ½ mile outside of a line drawn between Malusi and Tagulaya Points there is a broken chain of shoals covered by depths of ½ to 4 fathoms. The shoals begin about 1½ miles southwestward from Tagulaya Point and extend for a distance of about 2 miles in the same

direction. They are composed of sand and coral and are generally visible.

At a distance of 1½ miles 25° true from Tagulaya Point, and ¾ mile from shore, there is a small shoal covered by a least depth of 4 fathoms and surrounded by deep water.

The Daliao Reefs are 2 coral shoals which extend over 1 mile in a north—south direction. The northern reef, which begins about ½ mile southward of Daliao, is partly bare at low water. The southern reef is covered with shallow water except near the northern end, where there is a rock awash at low tide. Between these reefs and the shore there is a deep channel about 150 yards wide at its narrowest point. A small detached shoal covered by a least depth of 4¾ fathoms lies nearly ¼ mile northward from the north end of Daliao Reefs and over ¼ mile from the beach.

About ⅜ mile 160° true from the southern extremity of Dumalag Island there is a small shoal covered by a least depth of 5¼ fathoms. About ⅓ mile 107° true from the same point, there is another small shoal, of 4 fathoms. With the exception of the above shoals, Dumalag Point may be rounded in safety at a distance of ¼ mile.

(5) Landing beaches.

(a) Malalag Bay beaches. (PLAN 28, Section F(k); FIGURES IV - 129 to IV - 139) Reliability GOOD.

1. Location and extent. A discontinuous narrow sand beach runs for about 2½ miles along the southwestern coast of Malalag Bay, in part along the village of Bolton. The limits of this beach lie at 6° 35′ 15″ N, 125° 25′ 20″ E, and 6° 36′ 10″ N, 125° 23′ 45″ E. Along the northeastern shore of the bay are several sand beaches at the inner edge of the fringing coral reef. These beaches are separated by headlands or areas of mangrove, but their total length is about 1 mile. The limits of these beaches are 6° 38′ 40″ N, 125° 25′ 10″ E, and 6° 36′ 10″ N, 125° 26′ 30″ E. Landmarks for Malalag Bay are Colapsin Point at the eastern entrance and Mout Piapi at the western entrance. The former is at the end of a peninsula and rises 265 feet above the sea; the latter is a heavily wooded hill 640 feet high.

2. Nearshore. The approach to Malalag Bay is obstructed by several reefs, one of which lies about 3,200 feet north-northeast of Colapsin Point. The largest reef is Piapi Reef located about 1 mile east of the coastal base of Mount Piapi. Bolton Reef lies near the center of the bay entrance (FIGURE IV - 120). Several shoals and coral reefs are also scattered along the northeastern shore of the bay within ½ mile of the shore (FIGURES IV - 129 and IV - 130). In the nearshore area, the bottom slopes are very gentle along the western shore of the bay north of the Balasinon River, but southeast of the river they steepen markedly and the shore is lined with a nearly continuous fringing coral reef. At the head of the bay the reef widens and the bottom slopes become less steep. The northeastern shore of the bay is lined with a narrow fringing reef, off which the bottom slopes vary from gentle to steep. The bottom material in the bay is mainly coral mud. The bay entrance faces northward and part of the shore is exposed to northeast winds and waves. However, the inner portion of the bay is relatively sheltered except for a heavy swell which sometimes bends around the headland at Colapsin Point. The mean tidal range is about 4 feet, and

FIGURE IV - 128. *Davao Gulf, W shore.*
Dumalag Point and Dumalag Island, low, wooded, and bordered with beaches, looking SSE. 1935.

FIGURE IV - 129. *Davao Gulf, Malalag Bay.*
Inner side of Colapsin Point, along E side of Malalag Bay, looking ESE. Note shoals and reefs. 1935.

FIGURE IV - 130. *Davao Gulf, Malalag Bay.*
Shoals, reefs, and islets off W coast of Colapsin Point, looking NNW from near head of Malalag Bay. 1937.

the flood tidal current moves northwestward along the coast opposite the bay entrance, with a branch of the stream flowing into the bay.

3. Character of beach. The beach along the southwestern shore of Malalag Bay is interrupted by the mouth of Malalag River and by several small rocky headlands and occasional limited patches of mangrove (FIGURE IV - 131). The beach is fronted by a fringing coral reef which averages 400 feet wide in the vicinity of Bolton village but farther southeastward widens to 600 feet or more. The fringing reef terminates near the Malalag River mouth, and in the vicinity of the Balasinon River mouth are extensive tidal flats which bare at low water (FIGURE IV - 132). The beach is composed mainly of coral sand, mixed with non-coral material in the vicinity of the Balasinon River. In this locality the beach is muddy and locally soft, but farther southeast along the fringing reef the sand is firm, and the beach slopes range from about 1 on 6 to 1 on 10. There are no structures along the beach, but there are fish traps on the fringing reef. The surf varies in intensity, becoming generally lighter to the southeast. The beaches along the northeastern shore of the bay are composed of coral sand. They are narrow and firm, with slopes steeper than 1 on 10. These beaches have no structures, and the surf is usually lighter than on the opposite shore of the bay.

4. Adjacent terrain and exits. The terrain inland of this beach area is a low river plain extending along the Balasinon and Malalag Rivers, but along the southwest shore of the bay heavily wooded hills approach closer to the shore (FIGURES IV - 133 to IV - 135). At the head of the bay is a plain which extends southeastward and joins the plain inland of Kulungan Bay. The promontory which terminates in Colapsin Point is a hilly ridge heavily wooded (FIGURES IV - 136 to 138). The plains have coconut plantations and cultivated fields. Immediately adjacent to the beach in the vicinity of the Balasinon River are areas of mangrove, and some mangrove occurs at the head of the bay. Exit from the beaches is generally available; the best exits are in the vicinity of Bolton, where a road leads to the town and a trail continues inland to join the main provincial road which runs northward to Digos and beyond. Locally the beach just southeastward of Bolton is backed by banks and fronted by tidal flats. The beaches along the northeast bay shore are backed by steep wooded slopes, with no known exit trails (FIGURES IV - 122 and IV - 139).

(*b*) *Mount Piapi beach.* (PLAN 28; FIGURES IV - 120 and IV - 140) Reliability FAIR. A sand beach about 1 mile long lies along the shore at the foot of the northeastern slopes of Mount Piapi. The limits of the beach lie at 6° 38′ 50″ N, 125° 22′ 45″ E, and 6° 39′ 50″ N, 125° 22′ 45″ E. Mount Piapi is a heavily wooded hill 640 feet high and serves as a good landmark.

The offshore approach to the beach is obstructed by Piapi Reef which bares at low water and lies about 1⅛ miles offshore from Mount Piapi. Within the 30-foot depth, the bottom gradient is gentle to flat. A fringing coral reef about 2,000 feet wide lines the northern half of the beach and continues northward of the beach limit. The beach is open to the east and is subject to heaviest winds and waves during the winter months of the northeast monsoon. The mean tidal range is about 4½ feet and the tidal current moves northward on flood.

The beach is composed mainly of sand with mixtures of coral sand and debris along the northern half. The beach is narrow above high tide and has a moderate slope becoming flatter to the south. The beach is generally firm. No structures occur along

FIGURE IV - 131. *Davao Gulf, Malalag Bay.*
SW side of Malalag Bay, looking SE. 1935.

FIGURE IV - 132. *Davao Gulf, Malalag Bay.*
W side of Malalag Bay, bordered by lowland, looking southward. 1935.

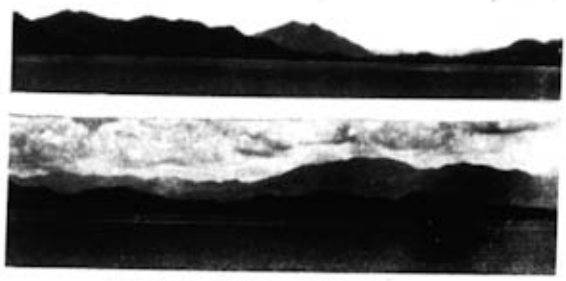

FIGURE IV - 133. *Davao Gulf, Malalag Bay.*
Two views SE from vicinity of entrance of Malalag Bay.

(*c*) *Santa Cruz beaches.* (PLAN 28, Section F(1); FIGURES IV - 125 and IV - 141 to IV - 143) Reliability GOOD.

1. Location and extent. For a distance of 11 miles south from Santa Cruz and 8 miles north is a stretch of coast nearly continuously lined with beaches. Three main beaches may be recognized. The southern one extends from Mangrove Island to Digos Point, a distance of 5 miles. This beach is relatively narrow and interrupted. Its limits are 6° 41′ N, 125° 22′ 40″ E, and 6° 45′ 30″ N, 125° 23′ 10″ E. The central beach extends from Tagabuli Bay to the northern part of Santa Cruz Point, a distance of 4 miles. The limits of this beach are 6° 48′ 10″ N, 125° 23′ 30″ E, and 6° 50′ 40″ N, 125° 25′ E. The northernmost beach begins about 2 miles southwest of Malusi Point and extends northeastward to Tagulaya Point, a distance of 6½ miles. The limits of this beach are 6° 51′ 20″ N, 125° 25′ 30″ E, and 6° 25′ 20″ N, 125° 29′ 20″ E. The most prominent landmark for this part of the coast is Mount Apo, 9,690 feet high, 13 miles northwest of Santa Cruz. The headlands along the shore are low and wooded and not very prominent.

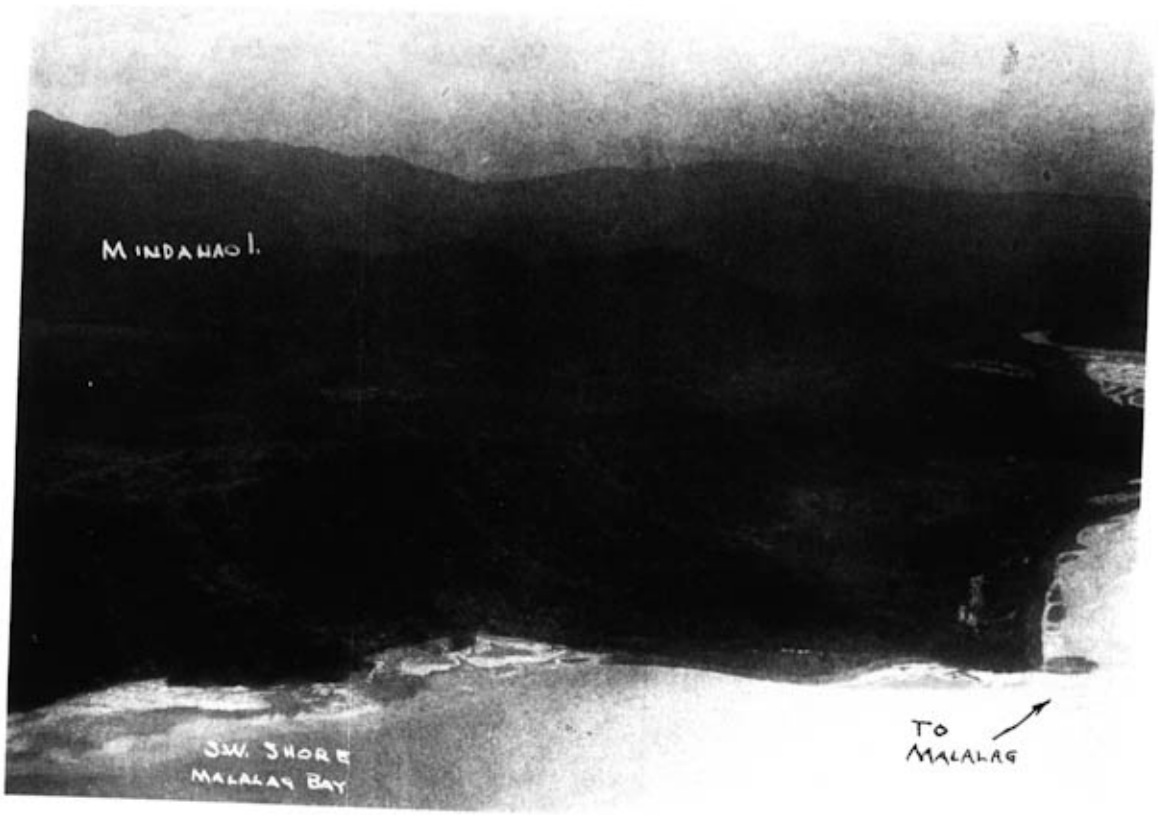

FIGURE IV - 134. *Davao Gulf, Malalag Bay.*
SW and W shore of Malalag Bay, looking westward. Wooded hills near the coast, low plains farther inland, mountains in background. 1935.

the beach. Surf may be moderately heavy when swell is running. Shore drift is variable but is predominantly to the northward.

In the south, a very narrow coastal plain lies between the beach and the steep wooded slopes of Mount Piapi. The plain widens to the north and is generally covered with a native growth of brush and trees (FIGURE IV - 140). The main provincial road parallels the coast about 2 miles inland and may be accessible across the plain. No trails along the coast are known.

2. Nearshore. The approach to the southern beach is obstructed along its northern part by the Digos Reefs which extend for nearly 2 miles offshore (FIGURE IV - 125). Between Tagabuli Bay and Santa Cruz the approach is clear, but northward of Santa Cruz Point is a reef and shoal area which extends interruptedly to Malusi Point. Between Malusi Point and Tagu-

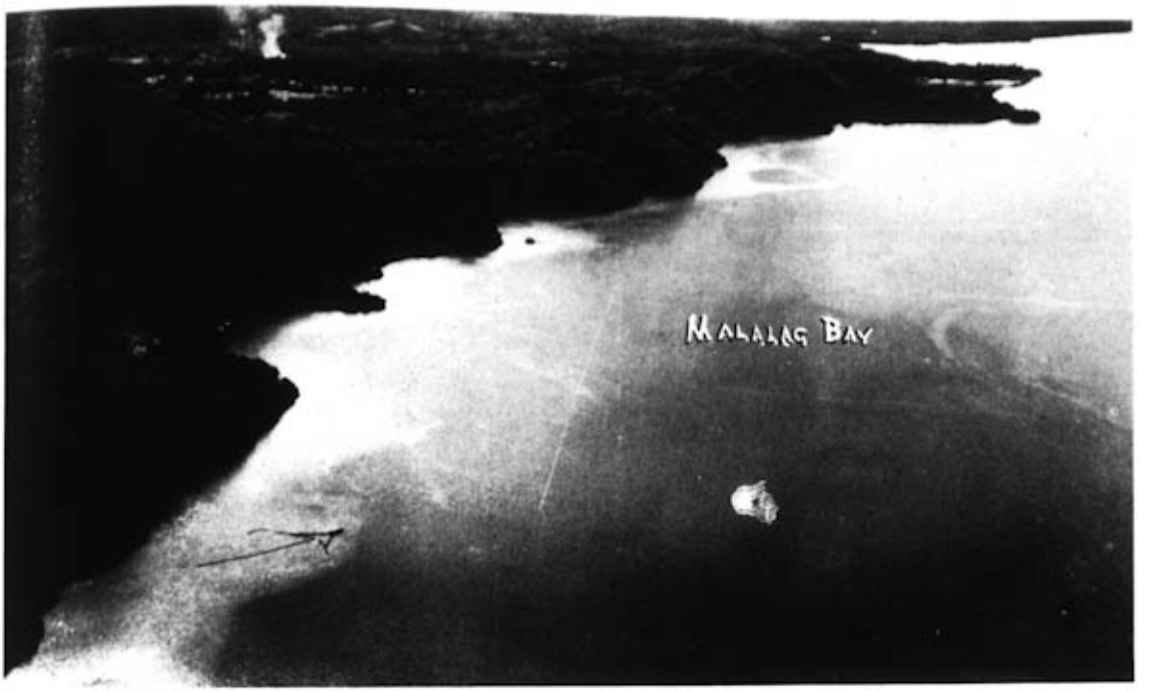

FIGURE IV - 135. *Davao Gulf, Malalag Bay.*
SW shore of Malalag Bay, looking WNW. Hills along coast, lowlands farther inland. 1935.

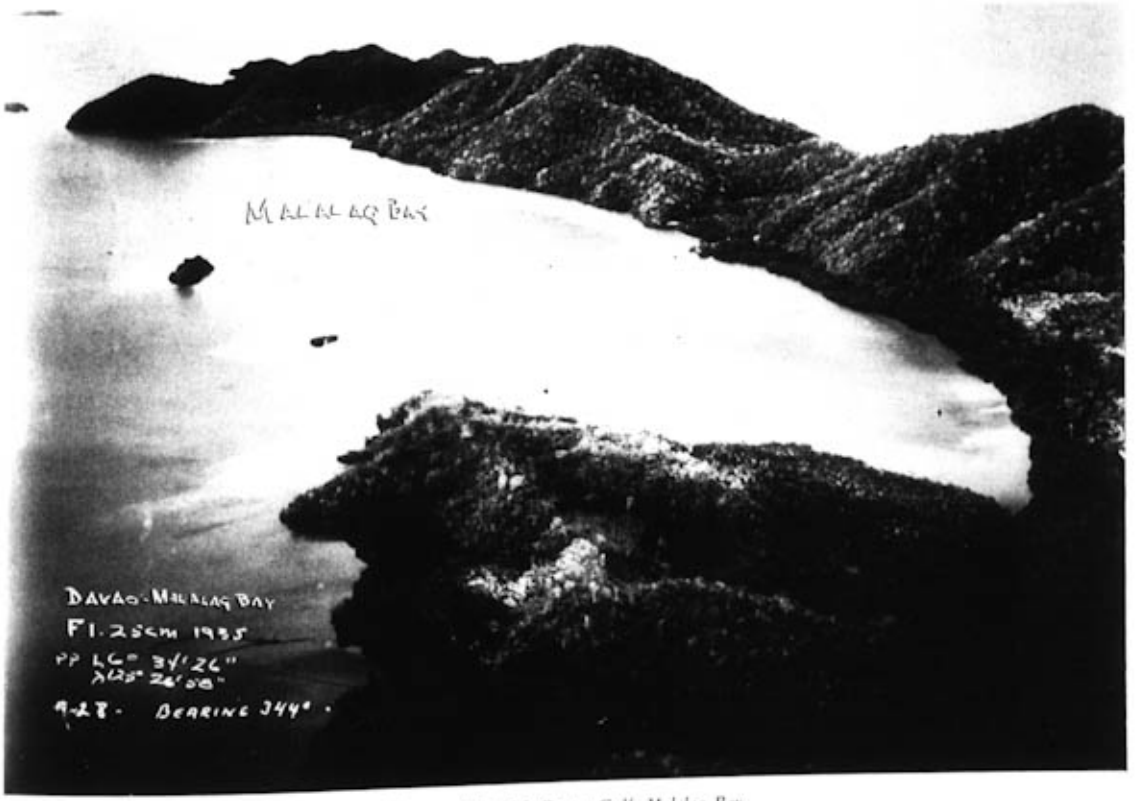

FIGURE IV - 136. *Davao Gulf, Malalag Bay.*
The steep, heavily wooded peninsula of Colapsin Point, fringed by coral reefs and, at shoreline at right, mangroves. Looking northward from near head of Malalag Bay. 1935.

FIGURE IV - 137. *Davao Gulf, Malalag Bay.*
Similar to FIGURE IV - 136, looking NNE.

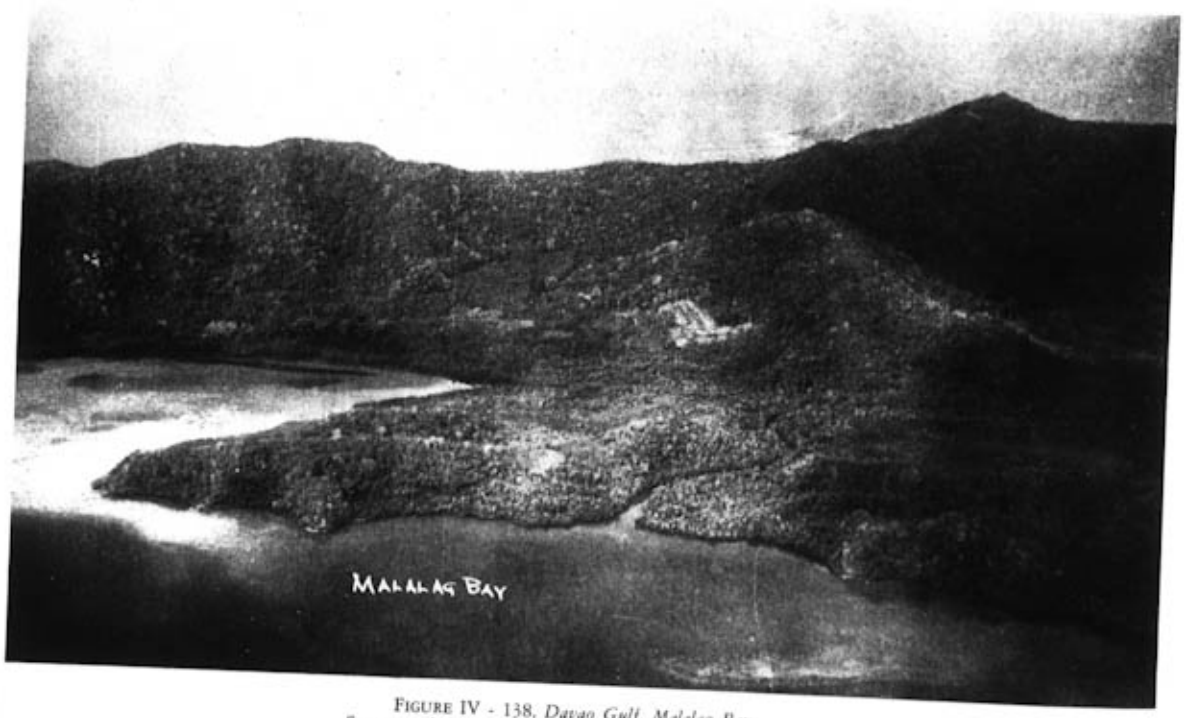

FIGURE IV - 138. *Davao Gulf, Malalag Bay.*
Steep wooded hills at head of Malalag Bay, looking ENE.

FIGURE IV - 139. *Davao Gulf, Malalag Bay.*
E side of Malalag Bay, from Colapsin Point to SW shore of bay, looking NE and E. Beaches are fronted by fringing reefs and mangroves, and backed by steep wooded slopes without exit trails. 1935.

FIGURE IV - 140. *Davao Gulf, W shore.*
Wide coastal plain just N of Malalag Bay and Mount Piapi, looking westward. 1935.

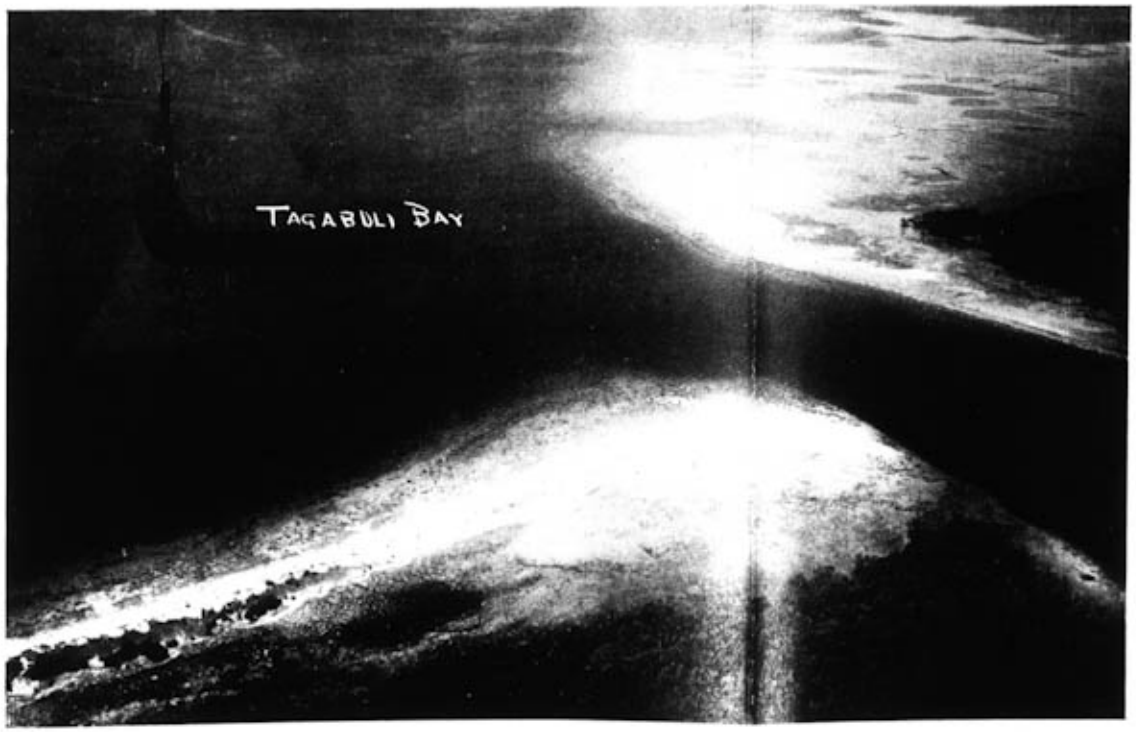

FIGURE IV - 141. *Davao Gulf*, W shore.
Tagabuli Bay, looking southeastward. Coral-sand beach, backed by fringing reef and mangrove. Fish trap left of center. 1935.

laya Point are several shoals extending for 1½ miles offshore. In the nearshore area, the bottom slopes are moderate. Fringing coral reefs occur between Digos Point and Tagabuli Bay, attaining a maximum width of nearly 1 mile. Between Santa Cruz Point and Tagulaya Point the fringing reef is much narrower. The bottom materials along this stretch of coast are mainly coral sand and mud, with some rocky patches among the shoals and reefs. The beach area is exposed to the east and is subject to winds and waves from the eastern quadrant. The average range of the tide is about 4 feet and the flood tidal current moves northward along the shore.

3. Character of beach. The southern beach, between Mangrove Island and Digos Point, is interrupted by the mouths of the Padada, Balutakay, and Digos Rivers. The Balutakay River has 2 lagoon-like extensions paralleling the shore north and south of its mouth, so that the beach in this vicinity lies along 2 narrow spits. The beach is composed of sand, partly of coral origin but mixed with non-coral sand and mud near the river mouths. The beach is firm except near the river mouths. The slopes vary from 1 on 10 to flatter than 1 on 25 in the muddy portions. The average beach width is about 25 feet. There are no structures along it.

The central beach from Tagabuli Bay to Santa Cruz extends along a hooked island backed by mangrove in its southern portion (FIGURES IV - 141 and IV - 142). In the vicinity of Santa Cruz, the beach is narrow and is fronted by a drying reef (FIGURE IV - 143). This beach is composed of coral sand and debris, and attains a maximum width of about 75 feet. No structures occur along this beach, but a fish trap is located on the inner edge of the reef behind the hooked portion of the beach.

The northern beach is interrupted at several places by rocky portions or by areas of mangrove. It is relatively narrow, is generally firm, and has slopes ranging from 1 on 6 to 1 on 10. There are no structures. All 3 beaches are subject to moderately heavy surf when swell is running.

4. Adjacent terrain and exits. The southern beach is backed by a low plain, partly wooded but mainly devoted to hemp and coconut palms. Local areas of swamp occur along the shore in the vicinity of the river mouths. The main provincial highway parallels the shore, about 1 mile inland until northward of Digos Point where it trends closer to the shore to Davao and beyond. The road is accessible from the beach at several points, especially from the settlements of Padada and Digos. Hills approach close to the shore at Tagabuli Bay, but from the bay northward is a narrow coastal plain rising inland to steep mountainous slopes. Thus the central beach fronts this narrow plain and the village of Santa Cruz occupies its central portion. The main coastal highway passes through the town. The northern beach is backed in part by this same narrow coastal plain, but from the settlement of Astorga northward the plain widens and is heavily wooded. The coastal highway runs through Astorga and at most points is readily accessible from the beach.

(*d*) *Talomo Bay beach.* (PLAN 28, Section F(m); FIGURES IV - 144 to IV - 149) Reliability GOOD.

1. Location and extent. The shores of Talomo Bay are lined with a sand beach interrupted by several river mouths. The

FIGURE IV - 142. *Davao Gulf, W shore.*
Tagabuli Bay, view just N of FIGURE IV - 141, looking SW. Mangrove along mouth and sides of bay, fringing reef and coral sand beach seaward, forest and coconut groves on land. 1935.

beach is about 13 miles long and is relatively narrow. The limits of the beach lie at 6° 55′ 30″ N, 125° 29′ 20″ E, and 7° 02′ N, 125° 34′ 30″ E. A landmark for the northern limit of the area is Dumalag Point, projecting about 1 mile from the general shoreline (FIGURE IV - 144). The point is low and wooded. Dumalag Island lies just off the point.

2. Nearshore. The approach to the shore is obstructed by several reefs and shoals, the southernmost of which lies about 2 miles north-northeast of Tagulaya Point. The Daliao Reefs extend for more than a mile southeast of Daliao. They bare partly at low water. Small shoal areas also lie off Dumalag Point at the northern end of the area (FIGURE IV - 145). In the nearshore area the bottom slopes are gentle to moderate with steeper portions along the narrow fringing coral reef which occurs in scattered patches along the shore. The bottom material is mainly coral mud, with some rocky patches. The bay is exposed to the southeast and east. The mean tidal range is about 4 feet and the flood tidal current moves northward and northeastward along the shore.

FIGURE IV - 143. *Davao Gulf, W shore.*
Coral beach at Santa Cruz, at N end of small coastal lowland, looking NW. 1935.

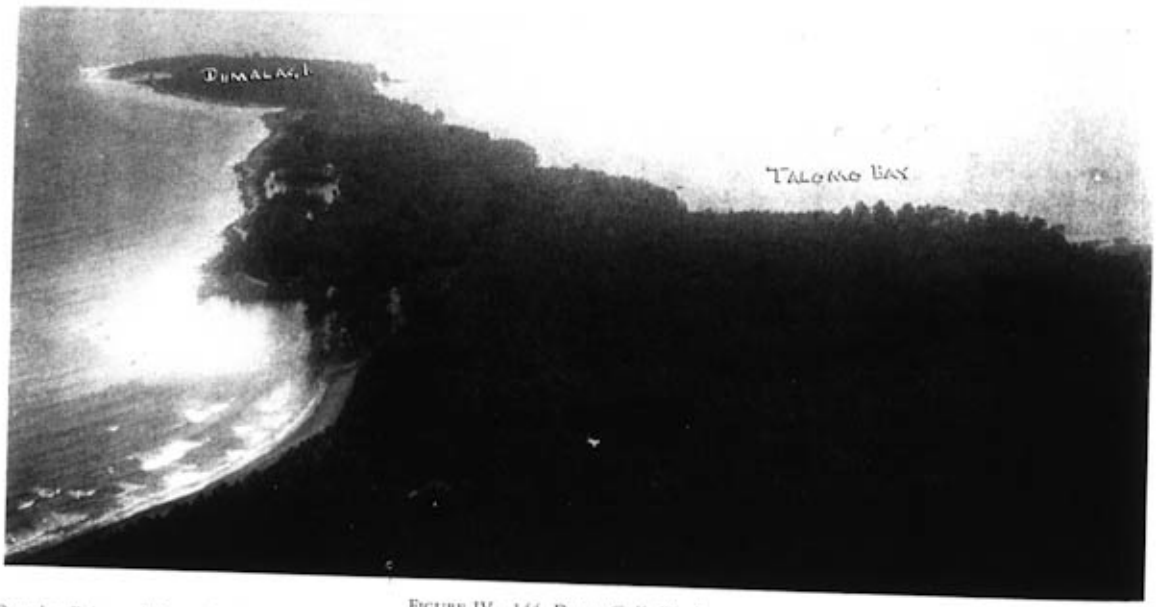

FIGURE IV - 144. *Davao Gulf, W shore.*
Dumalag Point and Dumalag island, at edge of Talomo Bay, looking southwestward. Peninsula flat, lined with beaches, and covered with woods. Coconut groves in foreground. 1935.

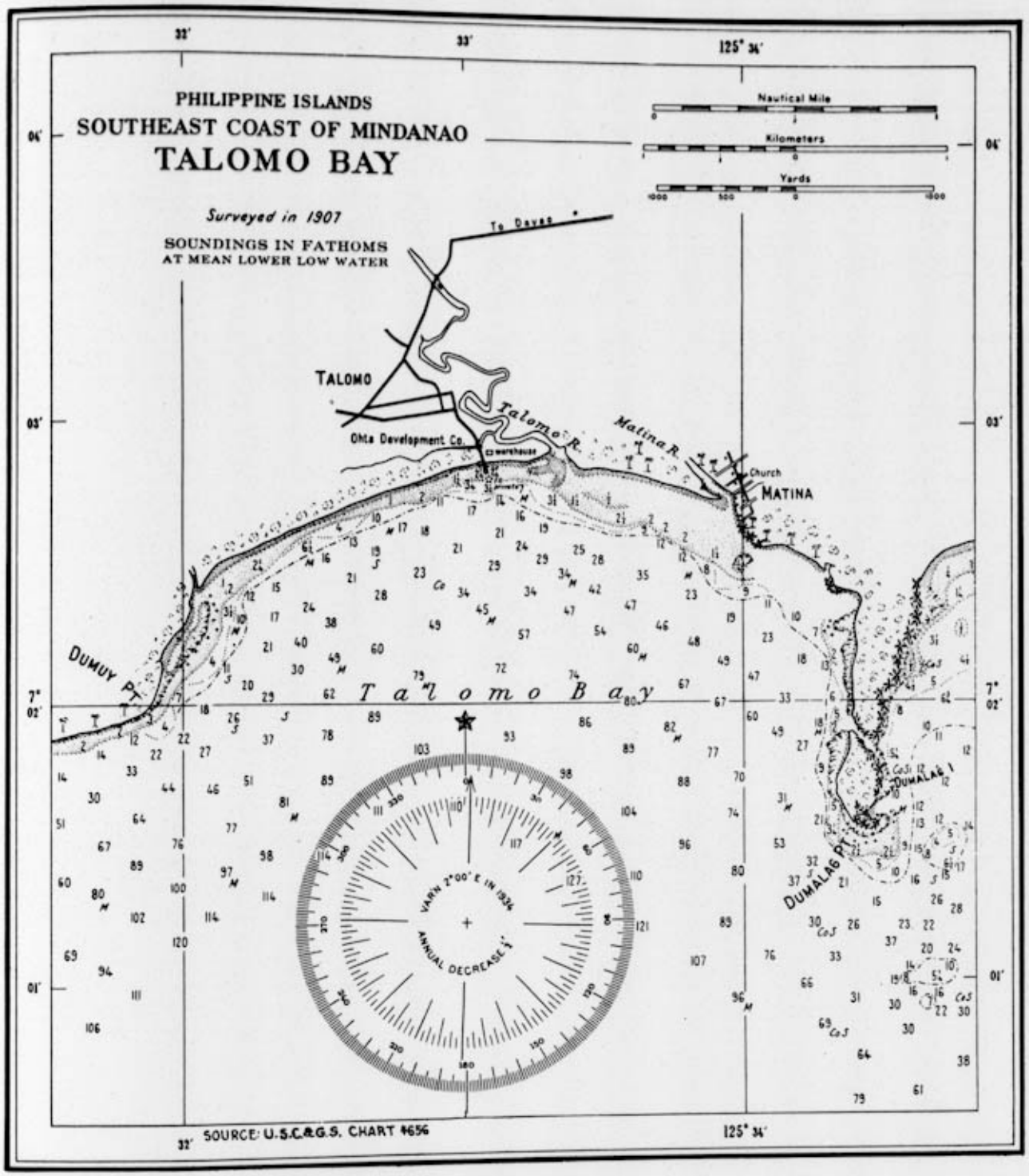

FIGURE IV - 145. *Davao Gulf, W shore.*
Chart of Talomo Bay.

3. Character of beach. The beach is composed mainly of coral sand, with some non-coral material in the vicinity of river mouths which interrupt it. At the mouth of the Sirawan River (FIGURE IV - 146) there is a lagoon extending northward, so that the beach here is a narrow spit. Near Daliao the beach continues narrow, and the fringing reef which fronts it is strewn with coral boulders (FIGURE IV - 147). At the town itself the beach widens, partly a result of accumulation along a pier (FIGURE IV - 148). Near Talomo, the beach narrows again, and it continues as a fringe of sand along both sides of Dumalag Point (FIGURE IV - 128). The beach is generally firm except near the mouths of the streams. The slope is usually as steep as 1 on 6, although near Daliao it flattens somewhat. Structures along the beach include the wharf or pier at Daliao, and a pier at Talomo (FIGURE IV - 149). Surf may be moderately heavy over a narrow belt parallel to the shore when swell is running.

4. Adjacent terrain and exits. The terrain back of Talomo Bay is a coastal plain which leads inland as a broad river plain. Much of the plain is heavily wooded, although cultivated areas occur nearer the coast. The beach is backed in considerable part by coconut groves. The villages of Sirawan, Daliao, and Talomo are joined by the coastal highway. This highway is apparently readily accessible from most parts of the beach. Fresh water is available at the Daliao wharf.

R. Davao Gulf Area: Talikud and Samal Islands.
(PLANS 28 and 31; U.S.C. and G.S. charts 4608, 4624)

(1) Offshore zone.

The 10-fathom line surrounding Talikud Island lies about 200 feet to ½ mile offshore. It is farthest from the coast off the north and south ends of the island. Along the entire east coast of Samal Island the line lies very close to shore; at several localities on the west coast it attains a maximum offshore distance of only ⅗ mile. Arboles Island, off the northwest coast of Samal Island, is surrounded by a bank of 10 fathoms or less, which is about ⅗ mile wide, and merges eastward with the 10-fathom zone off the coast of Samal Island. Off the Cruz Islands, northeast of Samal Island, the 10-fathom curve is not over ⅕ mile from shore, except on the narrow bank connecting Little and Big Cruz Islands. The water deepens very rapidly off all the islands, reaching a depth of 735 fathoms 5 miles east of the southeasternmost point of Samal Island.

The islands are encompassed by a belt of bottom sediments consisting of sand, coral, and coral debris. This zone extends from ½ to 2½ miles off the coasts. It merges seaward into deeper water sediments, composed of mud with numerous sand and coral patches.

Pakiputan Strait, separating Samal Island from the mainland, is ½ mile wide and 19 fathoms deep at its narrowest part (FIGURES IV - 150 to IV - 152). The tidal currents have at times a velocity of 2½ knots through this passage, the flood current setting northward and the ebb southward. There are several dangers in the approaches to the strait.

(2) Coastal topography.

(*a*) *Talikud Island.* Talikud Island lies westward from the southern end of Samal Island, from which it is separated by a deep, narrow channel about ¾ mile wide, known as Talikud Strait (FIGURES IV - 153 to IV - 156). The island is oval, about 4 miles long northwest—southeast, and 2 miles wide. Northward of the center it rises to a height of 475 feet, and is heavily wooded (FIGURE IV - 157). Its coasts are fringed by a narrow coral reef, which extends for about ½ mile from the northern end of the island. Talikud is reported to lack supplies of fresh water, and is only seasonally inhabited.

(*b*) *Samal Island.* Samal Island lies near the head of Davao Gulf close to its western shore, from which it is separated by Pakiputan Strait (FIGURE IV - 158). It is about 18 miles long between Bassa Point at the northern end and Paet Point at the southern end, and has a greatest width of about 8 miles between Linao and East Points, the western and eastern extremities of the island.

The rocky, mountainous interior is bordered by a coastal belt of very rugged, elevated coralline limestone (FIGURE IV - 159), narrowest along the eastern shore. The mountains are highest in the central and eastern portions of the island attaining a maximum elevation of approximately 1,700 feet about 3 miles southeastward from East Point. The hills are lower and more gently sloping in the northern, western, and southern sections.

Most of the island is blanketed by a heavy growth of tropical forest. However, the hills at the northern and southern ends are covered with sparse stands of timber alternating with considerable areas of cogon grass (FIGURE IV - 160), and coconut groves commonly fringe the western coast. The only cultivated areas of any size occur between Bassa and East Points, on the northeast coast of the island, where several native hemp plantations are located on small alluvial flats and adjacent hill slopes.

The few small permanent streams occur only on the west side. A few native villages are scattered along the west coast, none on the east.

The eastern, southern, and southwestern coasts of Samal are clean and steep-to, and in many places are backed by steep cliffs and bluffs (FIGURES IV - 161 and IV - 162). An almost continuous line of cliffs encircles the southern end of the island from Mushroom Rock westward to the middle of Talikud Strait. The western and northern shores, from the northern entrance of Talikud Strait to the large bight east of Bassa Point, are almost completely fringed by coral. Near the middle of the west coast the shore reef and the outlying foul ground extend seaward for a distance of ½ to 1½ miles.

On the west side of the island there is a sandy beach at the head of the bay between Pohun Point and the mouth of the Binulin River. The fishing village of Peñaplata is near the eastern end of this beach.

(*c*) *Minor islands.* Arboles Island, the most prominent landmark in Pakiputan Strait, is the summit of a coral reef about 1 mile long north—south and ⅛ mile wide, and is entirely covered at high water. The island consists of sand and coralline debris. Three or four very prominent mangrove trees, growing on the highest point of the island, furnish a good range for navigating the strait when approaching from the southward. There is a narrow channel with depths of 7 to 9 fathoms between Arboles and Samal Islands. (FIGURE IV - 164)

The 2 islands of the Cruz group are separated from Samal Island by a deep channel, nearly 1 mile wide at the south end of Big Cruz Island. Both islands are small and heavily wooded.

Big Cruz Island is 1¼ miles long north—south and 45 to 220 yards wide. On the north end is a knoll 80 feet high; the southern half has an elevation of about 90 feet, and terminates in cliffs much undercut by the sea. The shore is in some places fringed by a narrow coral reef.

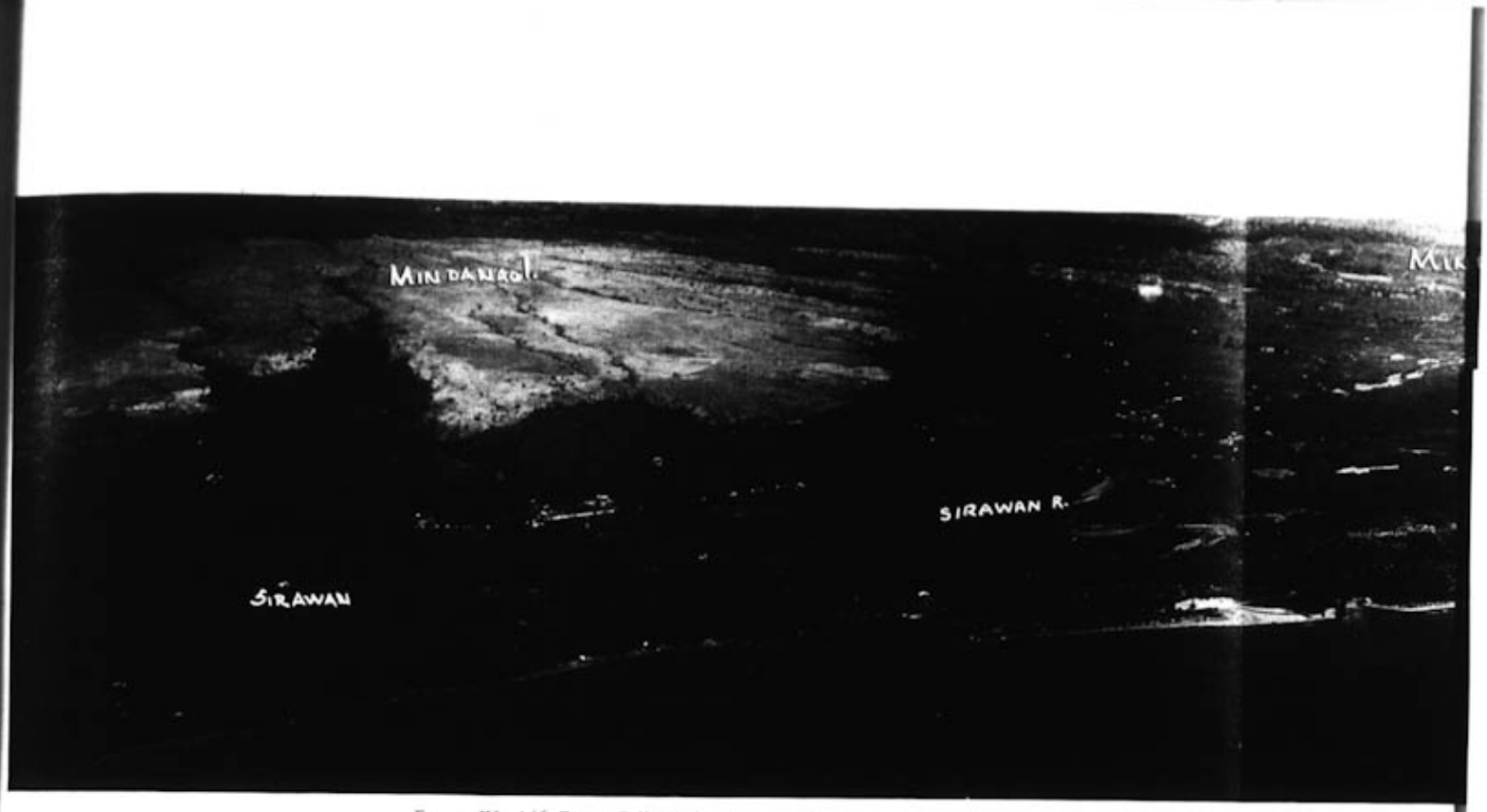

FIGURE IV - 146. *Davao Gulf, W shore.*
Coast from Sirawan to N of Daliao, looking between WNW and N. Coral beach, narrow except near Daliao, backed by lagoon near mouth of Sirawan River. Extensive plain inland. 1935.

FIGURE IV - 147. *Davao Gulf, W shore.*
Coral boulders on reef fringing beach near Daliao, looking westward. Mount Apo in background.

FIGURE IV - 148. *Davao Gulf, W shore.*
Pier and broad beach at Daliao, looking NE.

FIGURE IV - 149. *Davao Gulf, W shore.*
Pier and narrow beach at Talomo, looking westward.

ern end of the island but widens to 160 yards at the southern end.

(3) Anchorages.

The only good anchorage off Samal Island is in the bay on which the village of Peñaplata is situated, between Pohun Point and the mouth of the Binulun River. Here there is anchorage in 9 to 12 fathoms, muddy bottom, with shelter from northeast winds.

Malipano Anchorage, on the west side of Samal, lies about 2½ miles north of Maputian Point and the northern entrance to Talikud Strait. It is well protected from wind and sea by Malipano Islet and is surrounded by rocks and reefs (FIGURE IV - 163). The fact that there are a number of sunken reefs in the approach and that the entrance has a width of only about 100 yards between the 3-fathom curves makes this anchorage difficult of access. It is very small and of no commercial importance.

The best anchorage in Pakiputan Strait during northerly or southerly winds is about 1 mile northeastward from Linao Point (FIGURE IV - 164). Here the water is moderately deep close to the narrow fringing reef.

FIGURE IV - 150. *Davao Gulf, Samal Island.*
Pakiputan Strait, between Mindanao and Samal Island, looking north-northeastward. April 1935.

FIGURE IV - 151. *Davao Gulf, Samal Island*
Pakiputan Strait, looking south-southwestward. 1936.

Little Cruz Island lies nearly ¾ mile north-northwestward of Big Cruz Island. It is about 700 yards long north—south and has an average width of 110 yards. Near its northern end the island rises to a height of 42 feet. The western side is flanked by a sandy beach. From the northern point reefs partly bare at low water extend northward for a distance of about ¼ mile. The eastern shore is fringed by a reef which is narrow at the north-

(4) Dangers to navigation.

The only detached danger in the vicinity of Talikud Island is a shoal covered with a least depth of 2¼ fathoms, lying ½ mile 249° true from the southern point of the island and about ⅓ mile from the shore.

Near the middle of the western side of Samal Island there are

FIGURE IV - 152. *Davao Gulf, Samal Island.*
Pakiputan Strait and NW part of Samal Island, looking northward. 1935.

FIGURE IV - 153. *Davao Gulf, Samal and Talikud Islands.*
Talikud Strait, between Samal and Talikud Islands. Looking north-northwestward. 1935.

FIGURE IV - 154. *Davao Gulf, Samal and Talikud Islands.*
Talikud Strait, looking NNW. April 1935.

several detached charted shoals, none of which are over 1½ miles from shore.

The only danger in the southern approach to Pakiputan Strait is a rocky detached shoal, covered by a least depth of 2¼ fathoms, which lies 2 miles 56° true from the northern entrance point to the Davao River and ½ mile from the mainland.

The dangers in the northern approach to Pakiputan Strait include: a small detached reef covered by a least depth of 1[illegible] fathoms, lying a little over ¼ mile from the Mindanao coast and about 1 mile southwestward of Arboles Island; Arboles Island and its surrounding reefs; and a large reef about 1 mile southward from Arboles Island. The latter reef, the most dan-

gerous shoal in the northern part of the strait, lies about 1½ miles 188° true from the mangroves on Arboles Island and almost ½ mile from the Samal shore. Numerous coral heads covered by very little water occur on this shoal. In 2 small areas near the middle of the shoal the heads uncover at the lowest tides.

In the channel across the narrow 10-fathom bank which connects the Cruz Islands there is much broken ground, and a small coral patch bare at low water. The best water in the channel, 4½ to 7½ fathoms deep, lies immediately southward of the coral patch. Since the greater part of this channel is foul, it should be avoided in the absence of local knowledge.

About 1 mile northward of Little Cruz Island is a shoal about ¼ mile wide composed of coral limestone and sand. It is covered by a least depth of 2 fathoms, and is surrounded by deep water. Nearly ¼ mile north of this shoal is another small patch, under about 6 fathoms of water.

(5) Landing beaches. (PLAN 28; U.S.C. and G.S. chart 4624; FIGURES IV - 165 to IV - 170) Reliability FAIR.

(*a*) *Location and extent.* Scattered beaches lie along Samal Island. The northernmost tip of the island lies at 7° 11′ 55″ N, 125° 42′ 15″ E; the southernmost tip at 6° 53′ 35″ N, 125° 45′ 50″ E. Information on Talikud Island is very meager.

(*b*) *Nearshore.* The approach to these islands is generally clear from the south and east, but the 2 Santa Cruz Islands lie just northeast of Samal Island. Similarly, Arboles Island, a coral reef, lies off the northwest coast of Samal Island. Also, the western shore of Samal Island between Talikud Island and Pohun Point has numerous rocky shoals, partly coral, extending

FIGURE IV - 155. *Davao Gulf, Samal and Talikud Islands.*
Talikud Strait and SW coast of Samal Island, looking northward. 1935.

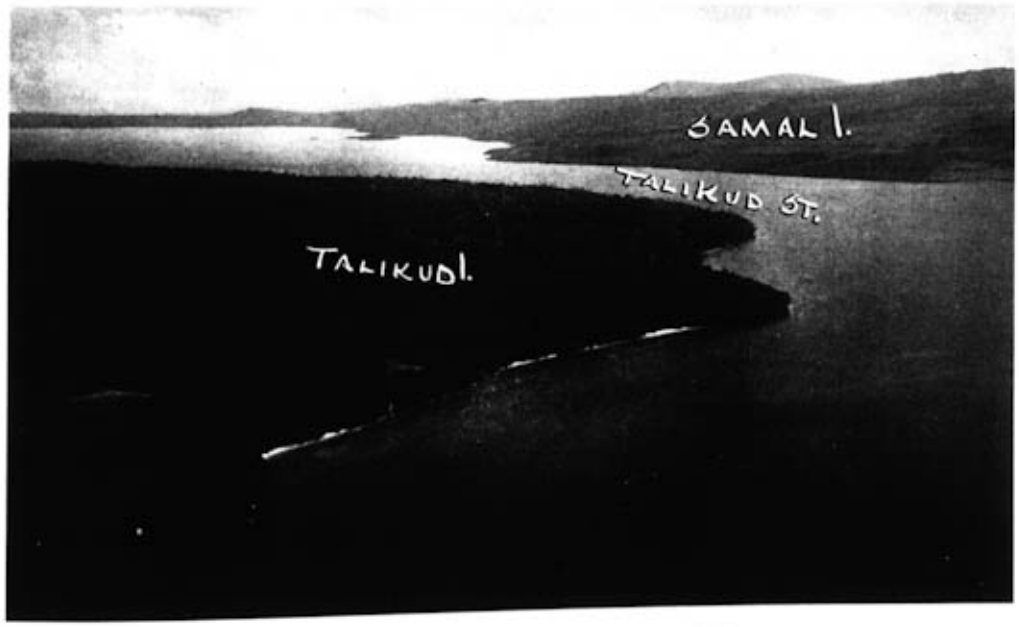

FIGURE IV - 156. *Davao Gulf, Samal and Talikud Islands.*
Talikud Strait and vicinity, looking north-northeastward. Small beaches along coast of Talikud Island, backed by wooded slopes. 1935.

FIGURE IV - 161. *Davao Gulf, Samal Island.*
S end of Samal Island, looking N. 1935.

FIGURE IV - 162. *Davao Gulf, Samal Island.*
SW coast of Samal Island, looking northeastward across N end of Talikud Strait. Steep wooded slopes along shore. Note fish traps on shoals left of center. 1935.

FIGURE IV - 163. *Davao Gulf, Samal Island.*
Malipano Anchorage off W coast of Samal Island, looking northeastward. 1935.

outward from the shore for as much as 2 miles. Nearly all Talikud Island is lined with a narrow fringing coral reef, but such reefs are more scattered along Samal Island. They occur locally along the eastern and western shores (FIGURE IV - 167) and the northern part of the island has fairly extensive reefs which locally attain a width of about 1,000 feet (FIGURE IV - 164). Data on the distribution of coral are not complete. Within the 30-foot depth the bottom slopes are generally moderate to steep, with this depth closely hugging the small promontories of the island. The bottom materials are sand and mud, mainly of coral origin, with some rocky patches. The mean range of the tide is about 4½ feet and the flood tidal current moves north-

FIGURE IV - 157. *Davao Gulf, Talikud Island.*
Looking NNW, showing gentle, heavily wooded slopes of Talikud Island. April 1935.

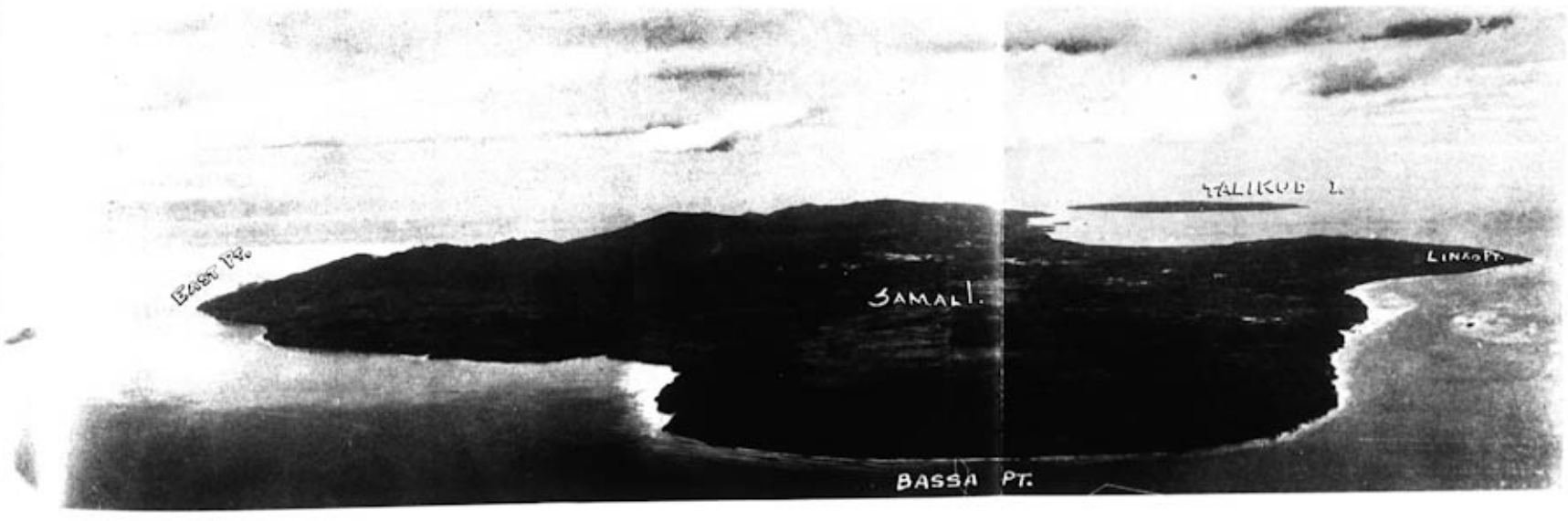

FIG
Rugged

FIGURE IV - 158. *Davao Gulf, Samal Isl*
Davao vicinity.
Lowland N of Davao in foreground, Pakipu
in middleground and Samal Island in ba
Town of Davao at extreme right. Looking
ENE and SE. 1935.

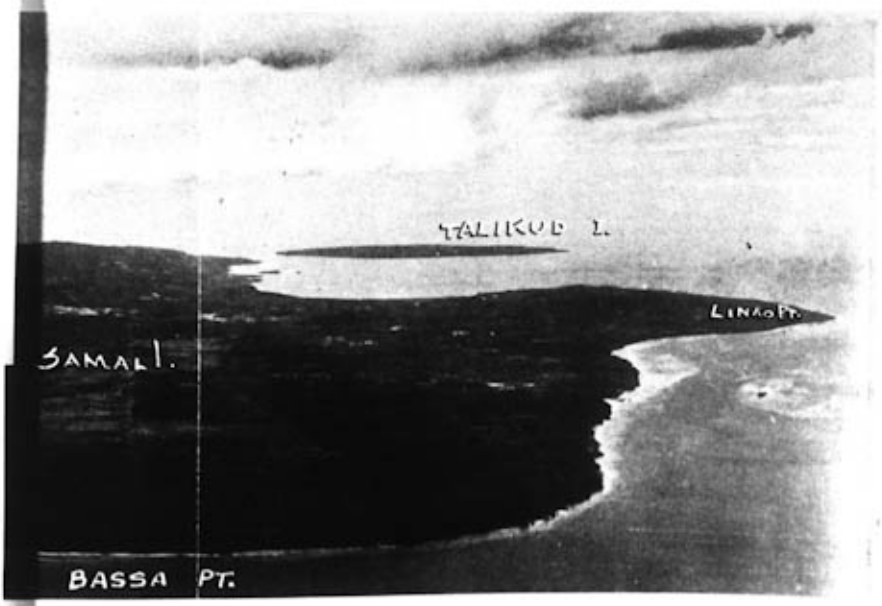

FIGURE IV - 160. *Davao Gulf, Samal Is*
Looking southward across Samal Island.

FIGURE IV - 164. *Davao Gulf, Samal Island.*
NW coast of Samal Island, looking NNE. Left foreground is best anchorage of Pakiputan Strait. 1935.

ward along both shores of the island as well as through Talikud and Pakiputan Straits. However, under the influence of driving winds the currents in the channels may be reversed. The islands are exposed to swell from the south along their southern parts, but the northern and western shores of Samal Island are generally free of heavy wave action.

(*c*) *Character of beaches.* Most beaches on Samal Island are small, many of them being pocket beaches at the heads of small coves or bights. However, an extensive sand beach occurs along the southeastern shore starting about 4 miles north of Paet Point, and running for 4 miles northward as a narrow fringe of sand at the base of moderate slopes. Another extensive beach extends about 2 miles on both sides of Linao Point along the western shore (FIGURE IV - 165). This beach is fronted by a narrow fringing coral reef.

One of the 2 best beaches on the island appears to be that at Peñaplata (FIGURES IV - 166 to IV - 170), running for nearly 2 miles along the bay east of Pohun Point. This beach is fronted by a fringing coral reef and has shoal water extending ½ mile offshore. There appears to be a channel through the shoal area to the settlement of Peñaplata. The other favorable beach lines the shore for 1 mile north of East Point along the eastern coast of the island. So far as known, this is free of coral. Surf is generally light on both these beaches. Conditions may also be favorable for landings at the scattered villages along the shore.

No structures are known anywhere along the islands. Shore drift is variable but apparently is mainly northward.

(*d*) *Adjacent terrain and exits.* The islands are heavily wooded in general, and only the coastal fringe and more level land are laid out locally in coconut plantations. Data on trails are meager, but a cross-country trail leads from Peñaplata to Taoang on the shore of Pakiputan Strait, and another trail crosses the southern part of the island.

S. Davao Gulf Area: Davao to Piso Point.

(PLANS 28 and 31; U.S.C. and G.S. charts 4608 and 4624)

(1) Offshore zone.

The 10-fathom line, lying 1/10 to ⅕ mile offshore, is farthest from the coast southwestward from Mansaca Point, near the head of Davao Gulf. Beyond the 10-fathom curve the bottom drops off abruptly; within 5 miles or less from shore the water reaches depths of 414 fathoms at the head of the gulf and 567 fathoms west-southwestward from Bonbon Point.

Close to the shore the bottom sediments consist of a very narrow belt of sand, coralline debris, and coral, interrupted by mud off the river mouths. The sand zone grades seaward into deeper water muds, with numerous sand and coral patches.

FIGURE IV - 165. *Davao Gulf, Samal Island and Davao vicinity.*
Looking southeastward across Pakiputan Strait to Samal Island. New airfield in foreground. Lanang Point and nearby oil tank left of center just beyond airfield. May 1938.

(2) Coastal topography.

Davao (FIGURES IV - 171 to IV - 173) lies on the north bank of the Davao River, beginning about 3/10 mile above its mouth. Between the shores of the gulf and the center of town, the sides of the river are fringed with mangrove swamps. The river has a depth of only 2 to 3 feet on its bar at low water. Since the channel changes frequently during freshets, local knowledge is necessary for crossing the large shoal area surrounding the river mouth. The town of Santa Ana (FIGURES IV - 171, IV - 172, and IV - 187), about 1 mile northeastward from the mouth of the river, is the port for the town of Davao (Chapter VI). Davao Light was displayed at an elevation of 53 feet above high water from the top of a white, steel-framed structure at Santa Ana. A steep 580-foot hill, with a large tree at its summit, lies about 2 miles west of Davao.

From the northern entrance point to the Davao River the coast trends northeastward for 4½ miles to Lanang Point. The relatively narrow coastal plain is low and flat. The soil consists principally of decomposed coralline limestone and is particularly well adapted to coconut cultivation. A broad belt of coconut groves and some brush bordering the shore is succeeded inland by dense woods. A continuous sandy beach extends from the Davao River to the village of Pakimikan, about 1¼ miles north of Lanang Point. The beach is fronted by broad sand flats baring at low water, with steep-to edges. For 2 miles south of Lanang Point the coral platform which underlies these flats is exposed along their margins at low water.

Lanang Point is low, gently rounded, and covered with coconut trees. It forms a very slight protuberance in the shore line, where the trend of coast changes from northeastward to north. The storage tank and wharf of the Asiatic Petroleum Company are located just south of the point. The wharf provides a berthing space 102 feet long parallel to the shore, with a controlling depth of 26 feet alongside in July 1937 (FIGURES IV - 174 to IV - 176).

From Lanang Point to the mouth of the Hijo River at the head of Davao Gulf the coast trends northward then northeastward, for about 18 miles.

From the Panacan River, which discharges about ¾ mile north of Pakimikan, northward to a point about midway between Ilang (Tibungko) and Bunawan, the coastal flat separating the foothills from the sea is very narrow and is fringed with occasional clumps of mangroves. From this locality a comparatively broad plain 1 to 5 miles wide extends northeastward to Hijo. The lowland continues farther inland in the form of wide alluvial flats bordering the numerous rivers which intersect this coast. There are many extensive swamps on the coastal plain and along the rivers. Except for the many hemp plantations along the Hijo River, the entire area from the shore to the mountains is mantled with dense tropical forests and jungle. The Tagum and Hijo Rivers are the largest emptying into the

head of Davao Gulf, but are of little importance to navigation. They are commonly lined with mangrove swamps for a short distance above their mouths. The coastal area between Lanang Point and the Hijo River is sparsely populated, with only a few small settlements.

The interior behind the coastal flats consists of rolling foothills occupying a great trough-like depression 30 to 40 miles wide and extending about 40 miles north-northeastward. This depression is bounded on the west by the high volcanic range in which Mount Apo is located and on the east by the mountains bordering the eastern coast of Mindanao.

The village of Ilang, about 4½ miles northward from Lanang Point, is the site of a sawmill. A coastal highway connects it with Davao on the south and with Tambungon on the north. (FIGURE IV - 177)

From a point about 1 mile north of Ilang to a point almost 2 miles northeast of the mouth of the Tagum River, the coast is fringed by a dense belt of mangroves, broken only in the small bight north of the Lasang River. From 1 mile southward of the Bunawan River to the broad coral point 2 miles southwestward from the Tagum River, a distance of about 7 miles, the shore is bordered by a mud flat which bares at low water for 150 to 600 yards offshore.

The Bunawan River, which discharges about 7 miles northward from Lanang Point, and the Lasang River, which discharges 2 miles northeastward from the Bunawan, terminate in pointed deltas. The delta of the Lasang is much the larger and more prominent (FIGURE IV - 178). Both rivers can be ascended by launches drawing 2 to 3 feet. At the river mouths there are shifting bars which make the entrance channels difficult to locate.

Midway in the bight between the Bunawan and Lasang Rivers is a coral reef ¾ mile long and ⅛ mile wide, awash at the lowest tides. It lies about 300 yards from the shore, from which it is separated by mud flats baring at low tide. The village of Tambungon lies on the north shore of the bight, slightly less than 1 mile west of the mouth of the Lasang River.

A prominent wooden building marks the end of the stone mole at the lumber mill. Small launches can go alongside the bulkhead at high tide, but at low tide the surrounding mud flat is practically dry. A sandy beach lies in front of the village.

In the small bight northward from the Lasang River the mangrove belt is interrupted by a straight, narrow, sand beach 2 miles long, backed by banks 2 to 5 feet high. The coastal plain behind the beach is bordered by a narrow belt of coconut palms which give way inland to brush and woods. The plain here seems higher and drier than the mangrove fringed flats to the northeast and southwest.

There is a fringe of coral over 200 yards wide at the broad mangrove-covered point 2 miles southwestward from the Tagum River. From this point to the mouths of the Tuganay and Tagum Rivers there is a broad sand beach 300 to 550 yards wide at low water.

The Tagum River is the best known and most important of the gulf. It has 6 feet of water on its bar at low tide, deeper water inside, and is reported to be navigable for 10 miles up-

FIGURE IV - 166, *Davao Gulf, Samal Island.*
Beach just NE of Pohun Point, W coast of Samal Island, looking northwestward. 1935.

FIGURE IV - 167. *Davao Gulf, Samal Island.*
Beach and fringing coral reef between Pohun Point and Peñaplata (Samal), looking NE. Continuation of coast shown in FIGURE IV - 166. One of the 2 best beaches of Samal Island. 1935.

FIGURE IV - 168. *Davao Gulf, Samal Island.*
W coast of Samal Island at Peñaplata, looking NNE. Continuation of FIGURE IV - 167. 1935.

stream. For this distance it has a uniform width of about 60 yards. Mangrove swamps partially line the sides of the Tagum for about 1 mile above its mouth. The Tuganay empties about 200 yards west of the Tagum (FIGURE IV - 179). Because of the proximity of the 2 rivers the appearance presented at high water is far different from that at low water. Between their mouths is a broad point of land that shifts with the channels. The ruins of an old Spanish fort lie just behind this point.

With the exception of the mangroves along the Tagum, the banks of both rivers are 2 to 4 feet high, generally solid, and heavily wooded upstream. With a flood tide there is little current in the lower portions of the rivers, but with a falling tide the rivers flow with a velocity of 2 to 4 knots. Large quantities of driftwood are continually brought downstream. The bars at the entrances of the rivers drop off abruptly into deep water.

From the mouth of the Tagum River to Mansaca Point, 3 miles northeastward, the shore for the first mile consists of mud flats, bare at low water; for the last 2 miles, of broad sand beach.

Mansaca Point is low and heavily wooded (FIGURE IV - 197). From Mansaca Point to the mouth of the Madaum River, 2 miles northeastward, and thence 1½ miles eastward to the mouth of the Hijo River the shore is a solid sand beach 150 to 600 yards wide at low water. The Madaum and Hijo Rivers are

FIGURE IV - 169. *Davao Gulf, Samal Island.*
Continuation southward of FIGURE IV - 168, looking northeastward. 1935.

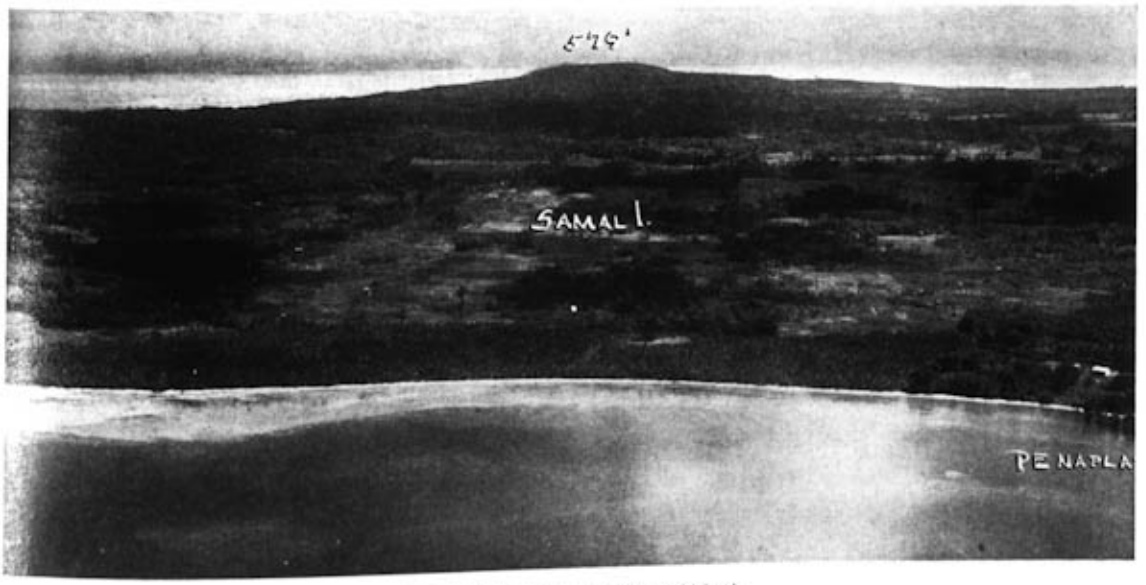

FIGURE IV - 170. *Davao Gulf, Samal Island.*
Another view of beach westward from Peñaplata and plain back of beach, looking N. 1935.

FIGURE IV - 171. *Davao Gulf, NW shore.*
Town of Davao, on north bank of Davao River, in left center. Santa Ana, port of Davao, in foreground. Looking southwestward. 17 January 1935.

the only ones of any consequence in this vicinity; the others are small streams not over 10 to 20 feet wide.

The Madaum River has 2 feet of water on its bar at low water and 12 feet inside. Although at its mouth it appears to be a large river, upstream it is hardly more than a mangrove slough (FIGURE IV - 198). On the eastern side of its outlet is a small coral point covered with mangroves. The village of Madaum, which is the headquarters of a large hemp plantation, is located on the north bank of the river just above the entrance. The alluvial flat surrounding the village is intersected by numerous drainage ditches.

The Hijo River (FIGURES IV - 180 and IV - 199) is shallow both at its mouth and inside the bar. During the rainy season the river is subject to frequent floods. Behind the mangrove swamps, lining the shore on either side of the river mouth, there are scattered coconut groves. The village of Hijo lies on the east bank of the river about 1 mile from the gulf. There are extensive hemp plantations on the surrounding alluvial flats. The buildings at the lumber concession in the extreme northeast corner of the gulf, about 1 mile eastward from the mouth of the river, show prominently offshore.

From the Hijo River down the eastern shore of the head of the gulf of Magnaga Bay, a distance of about 12 miles, there is a coastal plain ranging from ¼ mile wide at its northern end to 3 or 4 miles wide at Magnaga Bay. This lowland is backed by foothills and mountain ranges which rise rapidly to nearly 2,000 feet above sea level. A series of deep valleys separates the coastal mountains from interior ranges and peaks attaining elevations of about 4,000 feet. Except for scattered hemp plantations the entire coastal region is heavily wooded to the water's edge.

From the Hijo River to Pandasan Island the shore consists almost entirely of mangroves which are occasionally broken by small sandy beaches. With the exception of about 1 mile of muddy shore in the extreme northeast corner of the gulf, there is a fringe of coral 100 to 300 yards wide along this coast.

The village of Pandasan is 1 mile south of the mouth of the Lapinigan River and is surrounded by hemp plantations. A small stone pier and a sandy beach lie in front of the village.

Pandasan Island, lying about 4 miles southward from the Hijo River and close to shore, is difficult to distinguish from the mainland at a distance (FIGURE IV - 181). It is less than ¼ mile wide, fringed with coral, and separated from the mainland by a narrow channel blocked by reefs at its northern end. The

FIGURE IV - 172. *Davao Gulf, NW shore.*
Town of Davao and Davao River in foreground. Santa Ana on coast to right of center. Samal Island in upper right corner. Airfield in center background. Looking northeastward. September 1936.

mainland opposite the island is bordered by wide mangrove swamps and coral.

From Pandasan Island southward to a very small cove 1 mile south-southeast of Gill Point, the shore is solid and steep-to, and is bordered by a very narrow sand and gravel beach.

Kopia Island, about 1 mile long north-south and ⅓ mile wide, is southwest of Pandasan Island, from which it is separated by a channel about 600 yards wide. A swamp divides the island into a northern and a southern half. Kopia is low, covered partly by coconut groves and partly by dense woods, and completely encircled by a narrow coral-sand beach and a fringing coral reef. The small native settlement of Kopia is located on the eastern side.

The village of Tagnanan lies on the mainland opposite Kopia Island, on the south side of a small alluvial flat which is largely planted to hemp. A series of hemp plantations runs from here southward past the village of Mampising to Gill Point.

From the small cove 1 mile south of Gill Point to a small point about ½ mile south of the mouth of the Macapaluay Creek, the mangrove-covered shore is flanked by a coral reef up to 600 yards wide (FIGURES IV - 182 and IV - 183). Several deep channels lead through the reef into the mangroves. From the southern limit of the mangroves to Magnaga Bay a steep-to coral-sand beach extends along the coast.

Magnaga Bay (U.S.C. and G.S. chart 4656) is only a slight indentation in the coast. The village of Magnaga, behind which are several hemp plantations, lies at the head of the bay. For about ½ mile westward from the town a narrow belt of mangroves borders the shore. From Magnaga Bay to Pangasinan Point, 2½ miles southeastward, the coast is fringed by a sandy beach, and presents no unusual features. The village of Pantukan (Kingking) lies about ¼ mile south of the mouth of the Kingking River.

Pangasinan Point is low, heavily wooded, and fringed with a coral and sand beach which extends about 1⅓ miles southward from the point. Coconut groves extend to within 50 feet of the beach for a considerable distance north and south of the point.

Between Pangasinan and Piso Points the coast consists of a low, flat, heavily timbered plain, which extends inland several miles to the foothill region. The woods are occasionally interrupted by fairly extensive hemp plantations (FIGURE IV - 184). Ranges and peaks about 4,000 feet in elevation lie behind the foothills.

FIGURE IV - 173. *Davao Gulf, NW shore.*
View looking southwestward, W side of Pakiputan Strait. New airfield in foreground, Lanang Point in lower left, Pakiputan Strait along left edge, Davao River and Santa Ana in background.

FIGURE IV - 174. *Davao Gulf, NW shore.*
Looking N over Pakiputan Strait to Lanang Point. End of Samal Island in extreme right background. 1935.

FIGURE IV - 175. *Davao Gulf, NW shore.*
Tanks and wharf of Asiatic Petroleum Company where fringing coral reef is narrow at Lanang Point. Since the date of this view, airfield has been constructed in cleared area W of Lanang Point. Looking north-northwestward. 1935.

FIGURE IV - 176. *Davao Gulf, NW shore.*
Coast northward from Lanang Point. Wharf of Asiatic Petroleum Company at left edge. Looking north-northwestward. 1935.

FIGURE IV - 177. *Davao Gulf, NW shore.*
Ilang (Tibungko) sawmill establishment to right of center. One fish trap in center, near shore; others toward outer edge of shoals. Looking NNW. 1935.

Just northward of Piso Point the coastal plain disappears and from here to the mouth of the Mapagbo River in Magnaga Bay precipitous, heavily wooded mountains either rise directly from the water's edge or from a narrow fringe of mangroves (FIGURE IV - 185). The outermost peak of the range, lying 2½ miles eastward of Piso Point, has an altitude of 2,720 feet.

A fringing reef up to ⅖ mile wide occurs in the cove between Tambongon Creek and the north side of Piso Point. Mud flats, which bare for 50 to 60 yards at low water, overlie the nearshore portion of the reef, from the Pintatagan River to the small promontory in the middle of the north side of Piso Point. Mangroves line the shore at the head of the cove.

Piso Point, about 6 miles southeastward from Pangasinan Point, is a bold, heavily timbered headland rising to 775 feet, less than ⅜ mile from its western extremity. The point terminates in rocky cliffs fringed by a coral reef 60 to 100 yards wide.

(3) Anchorages.

(a) Ilang. Vessels may anchor in 20 fathoms of water off the southern mooring at Ilang. A white beacon, standing in 3 feet of water, marked the northern side of the entrance to a narrow channel which winds among the reefs to a small anchorage in 4 to 5 fathoms near the shore. This channel is navigable only by small launches, with local knowledge.

(b) Tambungon. Vessels may find anchorage in 10 to 20 fathoms about $^{9}/_{10}$ mile offshore.

(c) Tagum River. A poor anchorage may be found off the bar of the Tagum River in 15 to 20 fathoms, muddy bottom. It is reported that the bottom in this vicinity is quick and that vessels have lost their anchors here.

(d) Pandasan Island. A fair anchorage, sheltered from winds from northeast to southeast, in 12 to 15 fathoms, muddy bottom, may be found ¾ mile northward from Pandasan Island and ⅓ mile from shore.

Pandasan Island is separated from the mainland by a narrow channel blocked at the northern end by a coral reef. This channel, with a width of about 100 yards and depths of from 3 to 5 fathoms, forms an excellent harbor of refuge for small craft. The southward entrance has depths of 10 to 12 feet over muddy bottom.

(e) Kopia Island. Good anchorage for small vessels may be found inshore of Kopia Island by rounding the island from a distance of about 300 yards and anchoring in mid-channel, in 6 to 9 fathoms, abreast of the middle of the eastern side of the island. In the absence of local knowledge this anchorage should be approached only from the south, as the bottom of the channel between Pandasan and Kopia Island is foul.

Good anchorage for all classes of vessels, sheltered from winds from north-northwest to east-southeast, occurs southward of Kopia Island. There is sufficient swinging room to clear the 3¾-fathom shoal ½ mile southward from the island.

(f) Pantukan (Kingking). Large inter-island steamers have anchored ¼ to ½ mile off Pantukan, in 2 to 16 fathoms.

(g) Piso Point. Vessels may anchor in the bight northward of the point in about 15 fathoms of water.

(4) Dangers to navigation.

About midway between the mouth of the Davao River and Lanang Point, and approximately 1½ miles northeastward from